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ABSTRACT

Using a framework that draws upon current organizational theory and assumptions about knowledge utilization and school improvement this report examines the process of change at the school level. The model developed attempts both to categorize the "strategies" employed by the Research and Development Utilization (RDU) program/projects and to examine the effects of naturally occurring variations within these strategies upon a variety of intended and unanticipated outcomes. The model also incorporates the assumption that local site characteristics condition and interact with any external interventions and local decision-making behaviors, and have, therefore, both a direct and indirect impact upon any observable improvements or changes. The volume concludes with a summary of the findings and their implications for educational change strategies. (Author/MLF)

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Linking R&D with Schools

Strategies for Knowledge Use and School Improvement

Karen Seashore Louis
Sheila Rosenblum
James A. Molitor
with
Kent John Chabotar
Diane Kell
Robert K. Yin

Abt Associates Inc.

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U.S. Department of Education
T.H. Bell, Secretary

Office of Educational Research and Improvement
Donald J. Senese, Assistant Secretary-Designate

NATIONAL INSTITUTE of EDUCATION
Milton Goldberg, Acting Director

Program on Dissemination and
Improvement of Practice
Eunice Turk, Associate Director

Research and Educational Practice Program
Michael B. Kane, Assistant Director
Washington, D.C. 20208-1101

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PREFACE

In 1976, the National Institute of Education embarked upon an ambitious three year demonstration that was intended to field test new models of how best to provide schools with high quality information and technical assistance to help them solve locally identified problems. This effort, called the R&D Utilization (RDU) program, also included a significant research component, which operated both within seven funded service delivery projects, and through a three and a half year study, one part of which is reported in this volume. The study of the RDU program was not intended as a traditional evaluation of the degree to which demonstration objectives were met by each of the seven funded projects. Rather, the study nad a more general mandate to use the experiences of the RDU projects and the schools that became their clients to illuminate some enduring problems in creating and sustaining effective change programs in schools which have been voiced by researchers, policy makers, program managers and practitioners.

This general mandate has led to a wide variety of different reports, each of which addresses the general question of how to produce effective knowledge use and school improvement in schools from a different perspective, or for a different audience. This volume is intended to present an analysis of the strategies that were employed in the RDU program, and their impacts at the school level. While the question of program impacts is an evaluative one, our objectives must be viewed against a broader backdrop. Our approach to the task of "explaining" RDU and its impacts on schools has been deliberately eclectic in three different ways: we have attempted to combine ((1) policy research with more general social research orientations; (2) conceptual and empirical approaches to the phenomenon of managed school change; and (3) a research strategy that attempts to meld both quantitative and qualitative data throughout the analysis and within each chapter. Because these three forms of eclecticism are critical to the work, we would like to elaborate a bit more on the meaning of each for the study of the RDU program as it affected schools.

Both policy and social science research require empirical data to support their conclusions but, in general, the rules of evidence required for the latter are more stringent than for the former. There are sound reasons for the distinction: policy research, after all, is intended to feed into decision-making processes, and modestly supported conclusions in this context are better than no information. In science, on the other hand, incremental knowledge-building is the norm. In our work, we have chosen to take both large leaps and to make small steps in incremental knowledge. While, in some cases we expect that the more rigorous social scientist may be annoyed, we do so because our work is intended to feed into the world of policy and practice. If we do not draw the inferences that we believe appropriate, who will? On the other hand, we are convinced that our work is also well grounded in social science disciplinary bases, and, in particular, much of our evidence is so overwhelmingly strong that careful elaboration is appropriate in order to draw attention to its potential for contributing to basic knowledge.

Another major difference between policy and social science research is in the degree to which the researcher becomes an advocate for "social solutions" with the soical scientist providing "implications for future research" and the policy researcher "implications for legislation or program improvement." Again, we have chosen at some point to draw out the implications of our findings for potential practice. At other times, we do not, although many policy researchers might feel impelled to. In this report we have, on the whole, tended to draw away from policy recommendations, but in instances where we believe the data are both strong and relevant, we have made some assertions. We acknowledge this ambivalence, and note only that it reflects an inability on our part to draw totally away from practical implications of our findings even in what is largely a research monograph.

We have attempted to move between conceptual analysis and a detailed presentation of empirical data. In doing so, we believe that we may be in a position where we will please neither the theoretician who may find our middle-range theories trivial, nor the committed empiricist who will consistently cry, "but tell me what it <u>really</u> looks like out there--give me some examples." One of our reviewers has, in fact, warned us of the problems of flying at 10,000 feet: one is not high enough to rise above the turbulent air, but too high to see things clearly. Again, we can only state that we have tried to provide enough descriptive information to ground the attempt to provide a conceptual framework and an analysis which reveals a range of possible causal relationships, in the hopes that this will make the study of RDU of more lasting significance to both policy makers and researchers.

In addition, we have put ourselves in the position where there may be confusion as to (1) where we are introducing empirical data to support a priori conceptual frameworks; (2) where they are used to explain, post factum, findings that were not anticipated, and (3) where we are, as all researchers, engaging in "informed speculation," without the benefit of solid empirical evidence. We have tried to indicate throughout the volume, where we are following our conceptual model that was used to formulate the study, where we are elaborating on it based on accretions of knowledge over the course of the project, and where we are being most speculative. In particular, we have attempted to label our speculations and to refer to other research rather than simply to our own imaginative powers.

A final dilemma for our readers is in the way in which we have attempted to blend qualitative and quantitative data. Our approach is, by most disciplinary standards, unorthodox. We believe our attempts to create data from a variety of different sources, and our attempt to use a range of different analytic techniques is required in order to address the variety of questions that can be asked about a complex social process. On the other hand, while we have gained through our approach of using each bit of data available to us in its own way, we have lost something as well--both the certainty and reliability of traditional quantitative data bases and analysis, and the rich detail that is normally associated with qualitative analysis. In addition, we run the risk of confusing the reader, who may be interested in knowing whether an observation is based on survey data, case data that have been coded, or more traditional qualitative analysis techniques. While we have attempted to provide a reasonable guide to what data

are contributing to specific analyses, full specification would have been so tedious that we have not attempted it. What we hope we have done is to provide sufficient detail about our methods and our data sources that researchers of different methodological persuasions can judge for themselves how convincingly our data supported our interpretations.

To summarize, we have, in this volume, attempted to blend a variety of research traditions. To the extent that we are successful, it is because of the many advisors that we have had along the way. Specific mention should go to Michael Kane, currently of NIE, and formerly of Abt Associates where he was the initial project director of this study, who had the initial idea for a "consolidated coding form." John Egermeier, our indefatigable project officer, has provided advice, support and criticism which greatly facilitated the conduct of the study. Terry Deal, Sam Sieber and Ronald Corwin, who have served as project consultants, provided us with systematic praise and goads, each from his own special perspective. It is in large measure their compelling advice that drove us to try and achieve many things in one study. Robert Dentler and Robert Herriott have served as advisors to the study, and have reviewed and provided many suggestions about previous drafts of this and other reports. Eleanor Farrar reviewed a previous draft of the volume, and provided an insightful critique from her own conceptual/empirical perspective. Naida Bagenstos and Ward Mason of the National Institute of Education also critiqued previous drafts. It has been a pleasure to respond to such a stimulating group of colleagues and critics. The final responsibility for the document rests, of course, with the authors.

Without the administrative support and assistance of Thea Moskat throughout the past two and a half years, it is doubtful that we would have ever found our data in the ever-growing project files, much less have produced a legible report. We also acknowledge the editorial assistance of Sandy Margolin, which greatly improved this report, and the able assistance of Kathe Phinney in typing this volume.

We are especially indebted to the teachers, principals, superintendents and other administrators, field agents, and project staff who participated in the RDU program who agreed to have us "look over their shoulders" and question them, often at length. They have assisted us generously, despite the valuable time it took away from their primary task of improving their educational programs. We are grateful for their participation.

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CHAPTER 1

DISSEMINATION, KNOWLEDGE UTILIZATION AND SCHOOL IMPROVEMENT

INTRODUCTION

This volume explores three interrelated areas of educational policy and practice which have engendered persistent debate for the past two decades: dissemination, knowledge utilization and school improvement. Each of these treats the general problem of creating a climate for enhancing the effectiveness of the educational services that are delivered to children. Elsewhere (Louis and Rosenblum, 1981) we have analyzed the ways in which the design and management of interorganizational collaborative arrangements affected the delivery of services to schools and school improvement outcomes. Here the focus changes from questions of service delivery structures to the way in which various intervention strategies and local contexts affect knowledge utilization and school improvement outcomes. The overarching questions that guide this volume are:

- To what degree do various components of a dissemination-based intervention affect knowledge utilization and school improvement?
- To what degree are knowledge utilization and school improvement outcomes a function of persistent and durable characteristics of the local school and its context?
- Do dissemination-based intervention strategies have any effect on local knowledge utilization and school improvement activities that cannot be fully accounted for by local contextual characteristics?

On a more general level, these questions can be summarized as a part of the ongoing debate between advocates of planned or managed change and those who adopt a more naturalistic systems perspective, which tends to argue that the complexities of local organizational structure, climate and setting can, at best, be only partially "managed." A central question in this debate is, therefore, how much can reasonably be expected of schools that become involved in improvement efforts. At a policy level, these questions reflect the persistent disagreement between approaches that advocate federal and state support of modest (or even more major) interventions in local districts for the purposes of "improvement," and those who believe, equally firmly, that local schools should generally be left alone, and that federal and state interventions are as likely to produce regressive consequences as positive ones.

Indeed, within the field of education this entire debate has been stimulated by federal efforts over the past decade to promote educational innovation and the dissemination of successful educational programs. These efforts have taken place largely to help bridge the gap between knowledge producers (primarily university-based scholars) and the potential consumers

of knowledge (primarily practitioners and administrators at state and local levels). Without intervention, this gap would be more likely to increase than decrease in the coming years, as the amount of specialized information proliferates and access to it by the generalist practitioner becomes more difficult. While researchers have bemoaned the fact that their results are not used, on the whole little initiative has emerged from the centers of knowledge production to develop sustained communication channels with practitioners. The academic system does not, for the most part, reward effort spent in the application of results, and the press of fulfilling traditional role obligations within the universities militates against individual and organizational efforts to develop linkages with a wide scope of users. Practitioners, too, have frequently shown only moderate initiative in approaching the knowledge producers for help in finding solutions to a growing set of problems. This is partly because they do not know how to initiate such contacts, and partly because the different perspectives of the service-oriented practitioner and the research-oriented academic make communication difficult when such contacts occur.

Because of the barriers between research and practice, it has become increasingly necessary to develop alternative ways to increase the flow of information from researcher to user and the flow of needs or problems from user to researcher. Historically, the field most active in this area has been agriculture, where the effort to develop institutionalized contacts between universities and farmers began in the mid-19th century. Recently, the need for such information flow has been voiced in most professions, particularly law and medicine. The field of education also has made many strides in this regard, largely as a result of federally funded efforts.

The past decade and a half has witnessed a tremendous growth of federal involvement, not only in funding the development of solutions to educational problems in both local school settings and research settings, but also in the funding of educational research. As Corwin and Nagi (1972) have pointed out, the increase in the research budget of the U.S. Office of Education (USOE) from the mid-50s to the mid-60s was one hundredfold, and the trend continued until the mid-70s (NIE, 1976). This funding of research, predicated on the assumption that knowledge is useful and will eventually result in a payoff to the larger society, has tended to be directed more to applied and developmental research than to basic research.

Since the existence of research has not always resulted in the increased use of research, the federal efforts have included the development of a variety of mechanisms designed explicitly to stimulate the use of innovations. In the late 1960s "centers of excellence"--R&D centers and 20 regional educational laboratories--were created to orient research activities towards developing educational innovations. Today the surviving centers and the regional laboratories have, as part of their mandate, the goal of diffusing the products they develop (NIE, 1979). Another major effort towards utilization of information was the creation of a computer-based cataloguing system called "Educational Resource Information Center" (ERIC), implemented through a series of 16 clearinghouses (Thompson, forthcoming).

Such structures are admirable in concept and have begun to attack the core goal of producing and disseminating usable information, but they

probably have not had a direct impact upon most American schools. Gideonse's (1970) review of research and development efforts in the United States concluded, for example, that lack of innovation characterized the curricula in over half the schools in the country, while the National Institute of Education (NIE) supported this conclusion with different data (NIE, 1973). Our own data, presented in Chapter 8, suggest that this has not changed significantly in the past decade.

Moreover, a study of innovations in urban high schools (Nelson and Sieber, 1976) found that many schools were adopting innovations that were considered to be of low quality by educational experts, indicating a need not only for improved dissemination processes, but also for improved quality control of disseminatable innovations. Of equal concern is the adoption of high-quality innovations in inappropriate situations (Carter et al., 1976).

It also became clear that the ERIC system, while highly acclaimed by practitioners as a valuable resource, may not be reaching a broad audience. An evaluation survey of ERIC users in 1970 by Frey (1972) found that 62% of the users were college students and only 21% of the users were practicing teachers.* In addition, a recent NIE report indicated that the level of effort devoted to dissemination by the centers and labs was generally low (NIE, 1975). Thus, additional avenues for the dissemination and utilization of educational knowledge and practices may be necessary.

The educational R&D system, including ERIC and the labs, has been faulted for its level of effort in disseminating research and new ideas to practitioners (see Thompson, 1981). In recent years, however, considerably more focus has been devoted to dissemination and regional service in the regional laboratories, as is exemplified by the Regional Development and Exchange programs, and the Cooperative School Improvement Program, both of which involve cross-lab cooperation in delivering regional dissemination services. Products of the ERIC system may also be in wider use, as a consequence of better dissemination practices in state departments and intermediate education agencies (Royster et al., 1981). Others, however, have noted that the problems do not rest entirely with the "senders" such as labs or universities. Rather, the incentive systems in schools do not necessarily reward the use of information or program change at the school level (Sieber, 1981), and the most cogent of messages may, therefore, fail to be heard.

FEDERAL AND STATE STRATEGIES FOR SCHOOL IMPROVEMENT

As a consequence of the increasing awareness of the gap between research on educational improvement and change in schools, federal and state agencies have been increasingly involved in legislation and programs to stimulate innovation in schools. Several basic non-judicial federal/state strategies in stimulating local school improvement efforts have characterized

*It is important to note that many college students are future teachers, and some (unspecified) proportion of them may be actively teaching. There is no reason to think that direct access of ERIC by teachers has increased over the past decade, however.

the past two decades, among the most important of which are a legislative mandate strategy and a direct support strategy.

The legislative mandate strategy is, perhaps, the best known federal and state intervention mode, and is exemplified by legislation such as PL 94-142, which mandates individualized educational plans for handicapped children, or the sex equity provision in the Vocational Education Act of 1976. In these cases the legislatures and executive branches have produced laws and regulations which require districts that seek to receive funding from federal or state resources to meet certain specified standards. The basic purpose of the laws is not to create "innovation" or "knowledge utilization" in schools. However, much change may be stimulated in order to ensure that the monies available will be applied in settings which conform to legislative standards of equity, quality, or efficiency. Thus, the legislative mandate strategy is based on the observation that, if the value of the aid is large enough, and the changes required are within reasonable grasp of a local district, then legislative standards will stimulate districts and schools to change their behavior, where necessary, to conform. In the process, knowledge utilization and school improvement may (and according to practitioners frequently do) occur.

Since the mid-60s, a second, and widely used strategy for stimulating improvements has been for the federal or state government to provide support for innovative activities. Support may be of three types: fiscal, technological, or human.

Direct fiscal support strategies may range from "seed money" programs (short-term funding directed exclusively at promoting innovations in curriculum) to demonstrations to more permanent formula funding which has implicit and explicit guidelines that require innovation and change in order to meet program guidelines. For example, both the USOE and the NIE have been involved in the design of programs whose intent is to provide "seed money" targeted to the improvement of educational problems in schools. Among the programs that rely on such a strategy are those that have recently been studied by Berman et al. (1974; 1975; 1977), such as Right to Read, Title III and Title IV Bilingual Education. According to many school administrators, even Title I, which was intended almost exclusively as a compensatory program to target disadvantaged students, has been a major source or stimulation for program improvement, and has benefited students who do not directly receive Title I services. A more directed approach to the "seed money" strategy may be found in the NIE-sponsored Rural Experimental Schools program, in which participating school districts were asked to plan and implement locally developed programs for "comprehensive change" that touched upon all areas of school functioning (Herriott, 1980).

The strategies which are the focus of this research do not provide support directly to an innovating school or district. Rather, they attempt to develop a support structure that is outside the LEA, but which provides either technological or human support for school improvement. This approach has been a more recent development in education, but is growing very rapidly. For example, the growth of intermediate service agencies, which are typically supported at least in part by the state, has been enormous over the past ten years and shows few signs of abating (Yin and Gwaltney, 1981; Stephens et al.,

1979). The major function of intermediate service agencies in most states is to provide both technological (information retrieval, and other program information) support and support in providing staff development and training programs to supplement those that can be managed by local districts in their service area.*

The fiscal support strategy emphasizes innovation, but not necessarily the utilization of existing validated products that have emerged from R&D in education. The technological support strategy utilized in federal and state funding has been to encourage the adoption of existing programs through products of various types. Recent efforts of this type include the following examples:

- The Office of Education's sponsorship of the packaging of exemplary programs for dissemination and replication (PIPS). These consist of a small number of compensatory programs (the first set consisted of six programs) which have been locally developed, evaluated and approved through the Joint Dissemination Review Panel (JDRP) (Stearns et al., 1976; Campeau et al., 1980).

- The Pilot State Dissemination Project, inaugurated in 1970, in which seven field agents in three state-based organizations aided school practitioners in solving problems by drawing upon existing research information (Sieber et al., 1972).

- The National Diffusion Network (NDN), a national dissemination system established by the Office of Education in 1974, in which a limited number of "developer/demonstrators" (DDs) of locally developed programs approved by the Joint Dissemination Review Panel (JDRP) provide a limited amount of technical assistance to schools in the adoption of such programs. The DDs are "linked" to schools by "state facilitators" in 40 states and provide support services to a large number of schools (Emrick, 1976).**

- The State Capacity Building Program, established by NIE in 1975 to build comprehensive dissemination capacities within states. This program in 23 states focuses on building a comprehensive set of knowledge resources, developing means of linking educational client groups with the resource base and developing leadership and

*Another major function, and the original motivation behind the creation of ISAs in many states, is to coordinate many administrative functions that are performed more cost-effectively at a supra LEA level. However, even when these are the major purposes, indirect support for school improvement activities is also present in most cases.

**A major study of NDN and other federally funded dissemination activities is presently being completed by the NETWORK, Inc. under funding from the Department of Education.

management arrangements which facilitate the provision of such services (Royster et al., 1981).

- R&D Utilization Program funded by NIE in 1976, in which seven projects (four SEAs and three consortia) provided an intensive array of support services through linking agents serving approximately 300 schools. The projects supported the change process from problem identification to implementation of solutions and incorporation of innovations, constructing necessary linkages to a validated R&D outcome.

Most of the above programs also incorporate human support, through technical assistance to facilitate effective product choices, implementation or both. However, a few programs have placed greater emphasis upon the human assistance strategies than on the technological. The chief among these is the Documentation and Technical Assistance Program (DTA) which sought to assist schools in selected urban areas:

- DTA was funded by NIE to develop a knowledge base that focused on improving organizational process in schools. It emphasized pulling together "craft" knowledge and making it available to other schools through face-to-face, intensive assistance based on organization development principles (Miles, 1980).

For these and future programs to be successful, more than just the dissemination or utilization process needs to be understood. The objective of most research and development efforts, and the subsequent use of those efforts, is educational improvement. Educational improvement usually occurs through change in the structure and/or process of educational systems leading towards increased effectiveness in achieving individual and organizational outcomes. Therefore, the issues of dissemination, utilization and achievement of outcomes can be more productively examined, and recent efforts more meaningfully discussed and compared, by using an educational change conceptual framework. However, before turning to the task of explicating a model for understanding dissemination, utilization and school improvement, we must first achieve a better understanding of the meaning of these terms as we use them.

Dissemination, Knowledge Utilization and School Improvement: Clarifying the Issues

As the above discussion indicates, there is concern in both the research, practice and policy communities over the three issues on which this volume focuses. However, despite the attention given to them, they are often referred to interchangeably, and inadequate distinctions are made between a dissemination focus, a knowledge utilization focus, and a school improvement focus. The lack of attention paid to defining these terms more precisely, and showing how they are interrelated has led, in many cases, to debates over non-issues, or to major disagreements over policies that are not incompatible. In addition, to laymen the confusion of terms and their interchangeable use sounds faddish and full of jargon. Our approach to defining the terms will not attempt an intellectual or policy

history, in large measure because, despite the contentions of some policy researchers, we are not convinced that there has been any clear evolution from one focus to another (Thompson, 1980). Rather, each focus has a distinctive history, and each has interacted with the others in a variety of ways over time.

Dissemination. The term dissemination implies a focus upon a sender of information. Whether dissemination is impersonal (sending out information, using television spots) or two-way (involving intensive contact between a change agent and a receiver) the emphasis in dissemination is on the process of supporting the spread and exchange of information. According to the recent report of the Dissemination Analysis Group (1977), spread refers to "the one-way casting out of knowledge in all its forms" (p. 3), while exchange is defined as "the two-way or multi-way flow of information, products, ideas and materials" among a variety of actors (p. 4).*

The notion of dissemination implies a variety of policy/management questions, and a number of research or theory questions. Some of the managerial and policy issues relating to dissemination include the following:

- Since an agency or an individual is engaged in dissemination, what is to be disseminated?
- What criteria for determining the quality control procedures should be used in developing a base of information to be disseminated?
- How can systems be designed and implemented to most effectively retrieve relevant information from a knowledge base?
- What agencies are best placed to engage in dissemination activities?
- What kind of information can be most effectively disseminated?
- What mechanisms of "sending" should be used?

These issues have been in existence since at least the mid-60s, yet are far from being resolved. Thus, for example, despite the enormous effectiveness of the Educational Resources Information Center (ERIC) system, there are continuous management questions raised about how to screen, catalogue and store the ever increasing number of items which ERIC includes. Similarly, although the National Institute of Education commissioned a review of the

*The Dissemination Analysis Group report includes a broader definition of dissemination. However, we believe that the broader definition offered by this group muddies some distinctions in conceptual focus which are important. We therefore include the final two "levels" of dissemination used in the DAG report--choice and implementation--as part of knowledge utilization rather than dissemination.

Joint Dissemination Review Panel's procedures for certifying programs which was designed to broadly publicize the criteria by which new programs are judged (Tallmadge, 1977), in recent years some concerns have been raised by developers and practitioners about whether these criteria are always appropriate, and whether they are so burdensome as to discourage the inclusion of genuinely exemplary and innovative programs (Miles, 1980). In summary, there is a dilemma as to whether quality control issues should drive a dissemination system. Indeed, several of the reports that have been written as part of the Study of the R&D Utilization Program have focused explicitly on issues of dissemination (Yin et al., 1980; Louis and Rosenblum, 1981), as does this volume.

The theoretical issues underlying a dissemination perspective are well explicated, and focus on basic issues of interpersonal communication. What kinds of messages will be attended to by different receivers? In what ways, and to what degree do the mechanisms of transmission affect the impact on the receiver? What are the characteristics and behaviors of effective change agents or other transmitters of information from one group to another?

The term dissemination has recently come into some disrepute among a variety of policy analysts. It is often identified with a "technological perspective" on the process of social change, which is viewed as primitive in its explication of and attention to the social systems in which dissemination occurs (House, 1981). Others have attacked a dissemination focus because it does not attend adequately to the long-term effects of information after it reaches a receiver (Berman and McLaughlin, 1974), or even to the potential user system's need for information (Knott and Wildavsky, 1980). In its more extreme forms, "dissemination" has been assumed also to be imperialistic and mechanistic, attempting to squash local variations and impose externally determined modes of behavior (Miles, 1980; Thompson, 1981). As this volume will show, however, such issues are quite salient in almost any effort to develop a program of change for schools.

Knowledge Utilization. If dissemination focuses on the sender and sending of information, knowledge utilization emphasizes the user and user system. Knowledge use is not limited to the ways in which potential recipients of information from a dissemination activity use that information nor is it limited to how they use "external" information. Among the earliest programs supporting knowledge utilization, for example, were the School Study Councils, active during the 50s, which emphasized internal research and analysis (Dannenburg, 1970; National School Development Council, 1979). Knowledge use can be viewed as the study of generic problems encountered when individuals and organizations look for, react to, create and make use of knowledge or information. More broadly conceived, it is often viewed as incorporating the study of planned change, since planned change activities invariably include "using knowledge."

In recent years, interest in developing policy related to knowledge use, and in studying knowledge use in education has burgeoned, perhaps largely as a result of a number of studies that emerged in the later 60s and early 70s which indicated that actual change in schools as a result of claimed "knowledge use" was often limited (Gross et al., 1971; Charters

and Pellegrin, 1973; Gideonse, 1970). A potpourri of policy and management issues that represent enduring but unresolved problems are:

- To what degree should adaptation of developed products be encouraged or proscribed?
- How can policy or program management improve the choices that schools and educators make in choosing new programmatic efforts?
- How can externally developed programs foster better planning and implementation activities in schools?
- What is the appropriate level (classroom, school or district) to encourage and support knowledge utilization?

These questions, and others about knowledge use, reflect a basic concern about whether the process of knowledge use can be better defined, predicted, and assisted. In each of these areas, some progress has been made, but more is needed. For example, there is clear consensus that knowledge use is not a rational, dichotomous event as was often assumed in the recent past. Rather, knowledge use tends to be viewed as a cognate of personal or organizational change, and as a relatively long-term process that can be viewed in stages. Among the best known versions of a stage-of-use approach in education is the work of Gene Hall and his colleagues at the University of Texas (Hall et al., 1975), but early versions are apparent in applied psychology beginning with the 1940s (see Havelock, 1969, Chapter 3, for a review of early research). Because knowledge use is a complex personal and organizational process, there are many different types of use ranging from implementation of new programs on a district-wide basis to routine, everyday use of knowledge by teachers in classrooms (Huberman, 1981). Again, this notion of multiple types of use is not novel, but has achieved new currency as a consequence of recent work which has attempted to account for the lack of "implementation" of research findings in policy (Weiss, 1980; Lindbloom and Cohen, 1980; and Patton, 1979). Other issues which have circulated for years, both in education and general organizational literature, concern the effects of participation in decision making on use at the individual and organizational level.

It is important to emphasize that, while knowledge use has received a great deal of attention, the conceptual issues are far from resolved. For example, over the past ten years, knowledge utilization research has cycled away from an emphasis upon cognitive or personal change, toward an emphasis upon implementation of new programs at the organizational level and currently the emphasis is upon cumulative adjustments between knowledge and individual or organizational behavior. Although conceptual clarity is not yet apparent, one thing is clear: knowledge use has changed from a status as the dependent variable in a study of dissemination or diffusion, to an arena of study in its own right.

School Improvement. In the field of education, school improvement may be thought of as the implicit objective of both dissemination and knowledge utilization. It is also, however, an area of programmatic and research

activity with a distinct focus of its own. First, while a school improvement focus emphasizes improvements in student outcomes it often has a broader meaning which encompasses not only improvements in curriculum and cognitive achievement, but also covers expanding the school's capacity--capacity for selfrenewal, for innovation, and for knowledge utilization (Miles and Lake, 1967). Thus, school improvement tends to focus not only on the technology of teaching, but also on the incentive structure, the distribution and availability of resources, and school climate and staff development activities. The notion of school improvement is often reformist in intent and approach. Rather than assuming that better schools can result from rearranging the various teaching tasks or from broader availability of curriculum, school improvement often commits itself to changing the structure and decision-making patterns in schools, and to making basic changes in the degree to which school personnel believe they can take responsibility for their own activities. For example, the 1973 NIE report, Building Capacity for Renewal and Reform, makes the following statement:

> Because of the diversity within the operating system and the decentralized decision-making processes, reform and renewal of local school districts will occur only if those districts develop the capacity to be more analytic in their behavior, more sophisticated in the choice and use of resources...and better able to assess critically the effectiveness of what they are doing (p. 94).

A basic assumption underlying the school improvement focus is that, in order to provide an effective climate for learning, schools must be "healthy" organizations. In addition, it is often emphasized that

> Real improvement in learning is determined not so much by the adoption of specific educational practices as by the modification of organizational conservatism . . . and organizational pathology (Schmuck and Miles, 1971, p. 1).

Programmatic thrusts with a strong school improvement focus in the broadest sense have more often come from agencies not associated with state or federal government. For example, the League of Cooperative Schools was sponsored by a non-profit organization called I/D/E/A. Individually Guided Education (IGE) which is officially designated as an "R&D curriculum innovation" is, in fact, a reformist program for restructuring the entire school to be more congruent with school improvement ideals. However, the federal government has sponsored some activities of this nature, typically with the goal of achieving school improvement through a managed change focus and/or improvements in the knowledge utilization capacities of schools. Perhaps most ambitious among these activities has been the Documentation and Technical Assistance Project, sponsored by the National Institute of Education, and described briefly above.

The emphasis on school improvement is, however, rarely an end in itself. Rather, there are clear assumptions underlying this focus that, in order to improve the delivery of services to students and to improve student cognitive outcomes, schools must become more vital, self-sustaining organizations.

COMBINING THE THREE FOCI IN PRACTICE: THE R&D UTILIZATION PROGRAM

In June 1976, the National Institute of Education (NIE) established the Research and Development Utilization (RDU) program as a new action-research effort in dissemination. One of the major propositions that the RDU program was designed to test was whether school-level practices could be improved by making external resources available to school personnel. Overall, the program strategy was to:

- organize a linkage system whereby national, state and other external resources would be made available to school personnel (dissemination focus);
- apply research-based products or ideas to locally defined school problems (knowledge use focus); and
- develop a problem-solving process whereby schools would systematically identify such problems and select and implement new ideas (school improvement focus).

The RDU program is unusual among federally funded dissemination strategies because of its commitment to the dissemination and use of R&D products and the development of local school capabilities to solve problems through the use of externally generated knowledge. Other federal programs have tended to concentrate on either product dissemination or local capacity building, but have not concentrated on an integrated model for combining them.* The core of the RDU strategy was to provide each participating site, either a school or a district, with assistance in the following sequence of activities:

- identification of a problem or set of problems;
- examination of alternative solutions to the problem, focusing particularly on the products of educational research and development (R&D);
- selection of a specific solution to address the problem;
- implementation of the solution; and
- evaluation and incorporation of both the solution and the problem-solving process.

The service delivery system of the RDU program operated through seven projects, each of which coordinated a network of organizations and individuals that were involved in the provision of services and information to local schools and districts. Although the seven projects varied in structure and design, most comprised four types of organizational units:

*The best statement of the assumptions underlying the program is found in Hutchins, 1975.

- A headquarters unit serving as the formal recipient of the federal award and as the general administrator of the rest of the network; four of the seven projects operated out of state departments of education and comprised a linkage system within a single state, one operated out of a state department of education but served a four-state region, and two operated out of other types of organizations (a non-profit educational R&D center in one case and a national association in the other) creating linkage systems dispersed across the entire nation;

- Resource organizations, often university-based or independent organizations that had developed their own expertise in educational R&D, training, and technical assistance. One function that was typically carried out by a resource organization was the consolidation of a "knowledge base," or pool of R&D products, developed as resources for identifying solutions to match client needs;

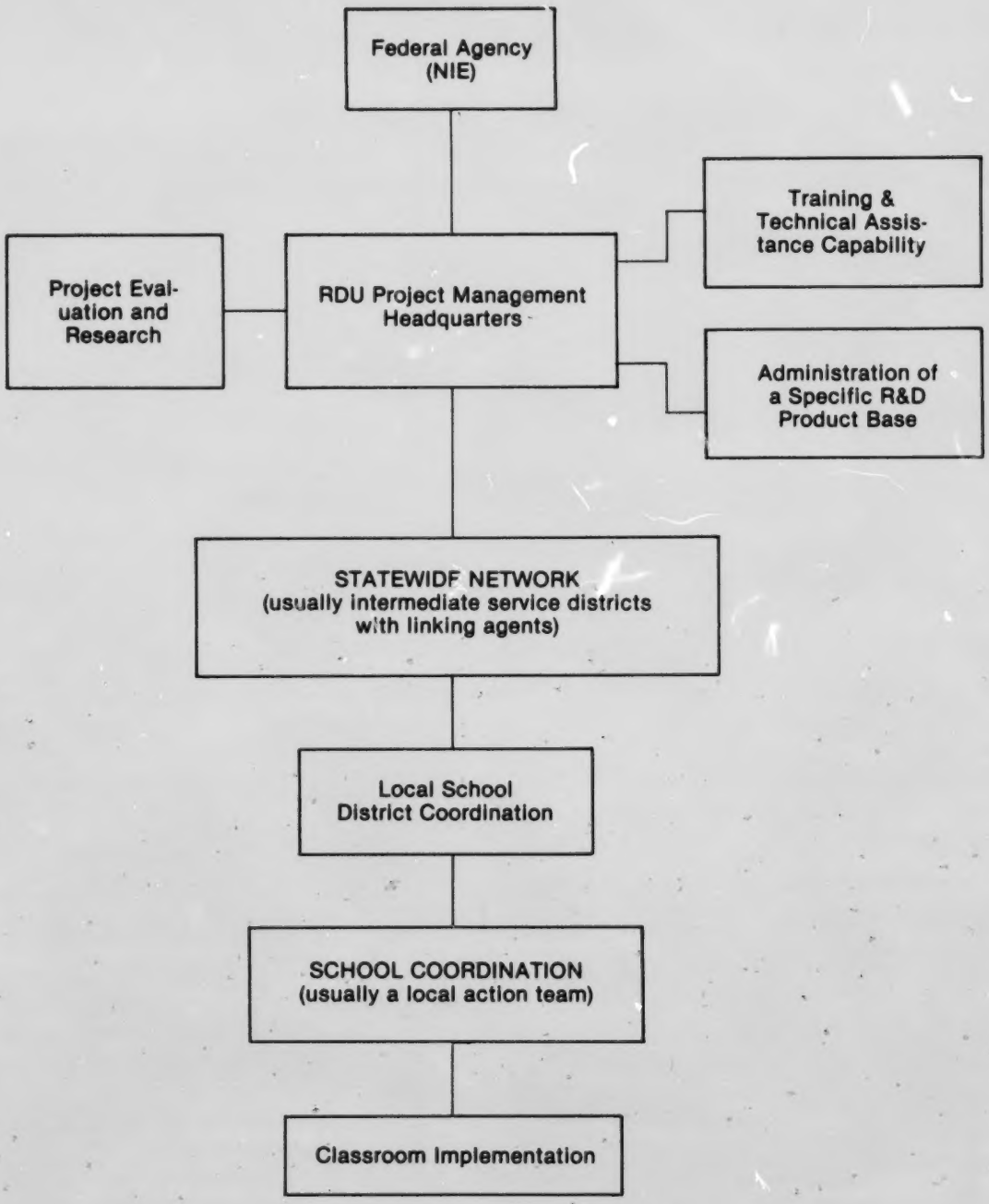
- Linkage organizations, usually an intermediate service agency or state educational agency, employing "field agents" who coordinated the services provided to local schools and districts, and who helped guide the local school personnel in a school improvement process. Each project supported two or more field agents; and

- Local school districts or schools which were responsible for engaging in a problem-solving process culminating in the adoption and implementation of new practices based on the "external knowledge"; each site typically established a local team of teachers and administrators, and with the assistance of the field agent, generally made major decisions related to the school improvement effort, thus fostering local ownership of the program and the selected solution.

The headquarters unit of each project developed a set of formal relationships, usually reflected in some subcontractual agreement, among the major participating resource and linkage organizations; formal agreements were also struck with participating school districts.

The network components were typically organized into a linked structure of horizontal functions, coordinated and/or conducted by the project headquarters unit, and vertical linkages through which the RDU project operated (see Figure 1-1). The horizontal functions included project management, and the work of the resource organizations which developed and maintained a specific R&D product base, provided training and technical assistance, and conducted project evaluation and related research. The vertical linkages actually included some type of communication (either weak or strong) among six potential administrative levels through which the RDU projects operated or delivered services.

FIGURE 1-1
Functions and Linkages of Network Components


Federal Agency (NIE)
Training & Technical Assistance Capability
Project Evaluation and Research
RDU Project Management Headquarters
Administration of a Specific R&D Product Base
STATEWIDE NETWORK (usually intermediate service districts with linking agents)
Local School District Coordination
SCHOOL COORDINATION (usually a local action team)
Classroom Implementation

The seven RDU projects were regionally distributed, and included the following:

- The Northwest Reading Consortium, involving the state departments of education and other agencies in Washington, Oregon, Alaska and Idaho;
- The National Education Association Inservice Education Project, operated in collaboration with the departments of education and corresponding state education associations in 12 states: Alabama, California, Iowa, Massachusetts, Michigan, Minnesota, Ohio, Pennsylvania, Tennessee, Washington, Wisconsin, and Wyoming;
- The Consortium, operated by The NETWORK, a non-profit research and service organization that coordinated the efforts of agencies in six states: California, Connecticut, Kansas, Massachusetts, Minnesota and Washington;
- The Georgia Research and Development Utilization Program;
- The Pennsylvania School Improvement Program;
- The Florida Linkage System; and
- The Michigan Career Education Dissemination Project. This project was operated by the state department of education as were the projects in Georgia, Pennsylvania and Florida.

All of the seven projects have completed the federally supported service delivery part of their activities. As a whole, the seven projects operated in 20 states and served over 300 schools or school districts over a three-year period (1976-1979). Over 90% of the local sites which became involved in the RDU program successfully completed the problem-solving process. Of these sites, 80% adopted and implemented a research-based new practice under the aegis of the program, and most of these were received with enthusiasm in the schools. Thus, when viewed from the local site perspective, the networks that were created to help schools improve local practice can be considered a success; however, many of the projects faced significant problems in establishing themselves and in carrying out their functions (Louis and Rosenblum, 1981).

Overview of the Study of the R&D Utilization Program and School Outcomes

The RDU program, with its emphasis upon dissemination of tested information and the process of knowledge use in the local school, and its attention to broader school improvement functions in local schools presents an ideal opportunity to explore the way in which these different components interact in increasing the effectiveness of schooling.

The Study of the RDU Program

In November 1977, Abt Associates Inc., a social science research firm based in Cambridge, Massachusetts, contracted to conduct a study of the RDU program. The study addresses six major issues:

- how relationships are managed among the various agencies that possess the expertise and resources to help local schools solve problems;
- to what degree an intervention program such as RDU can help schools overcome barriers to successful problem solving (such as limited access to information or lack of planning skills, etc.);
- to what degree the products of educational R&D are relevant to the problems and contexts of local schools;
- what the impact is of the products of educational R&D once they have been adopted and implemented;
- what factors contribute to the institutionalization of the RDU approach within a variety of organizations; and
- how linking agents coordinate the flow of external resources to schools, and whether this helps the schools solve problems.

Data were collected in face-to-face focused but unstructured interviews at 51 sites from 1978 to 1980. Case studies were written on 46 sites, five of which also received site visits. We also conducted mailed surveys of principals and a sample of teachers at participating schools during the fall of 1979. Additional descriptions of our general methodological approach are presented in Chapter 3.

Our study of the operations and elements of the R&D Utilization program at the school level has had a number of components, of which this volume is only one. Two other reports have been directed at an audience of local administrators and practitioners, and have attempted to synthesize our observations about effective ways of building capacity for school improvement through the use of multi-constituent problem-solving groups (Kell and Louis, 1981; Louis, Rosenblum and Kell, 1981). In another report, case materials illuminating broad problems of managing change within schools are presented, along with an analytic context for assisting local personnel in understanding the problems of managing a knowledge utilization and school improvement process (Louis, Kell, Chabotar and Sieber, 1981).* In this volume our focus is more firmly grounded in the policy questions which stimulated the development of the RDU demonstration: e.g., the impact of dissemination strategies upon knowledge utilization and school improvement.

*An annotated bibliography of all reports from this study may be found in Louis and Rosenblum (1981b).

Our general approach to this volume has been to develop a theoretically and empirically grounded schema that attempts both to categorize the "strategies" employed by the RDU projects into different types--information, technical assistance, and a problem-solving process--and to examine the effects of various naturally occurring variations within these strategies upon a variety of intended and unanticipated potential outcomes. This schema also incorporates the assumption underlying the natural systems, school improvement focus, that local site characteristics condition and interact with any externally stimulated intervention and local decision-making behaviors, and have, therefore, both a direct and indirect impact upon any observable improvements or changes. The schema, which is further explicated in Chapter 2, is based not only upon empirical observations of ongoing activities in schools, but upon the broad set of literature regarding dissemination, school improvement and knowledge use.

CHAPTER 2

STRATEGIES FOR CHANGE AND SCHOOL IMPROVEMENT: A GENERALIZED MODEL

INTRODUCTION

The RDU program consisted of a combination of strategies for school improvement that emphasized dissemination of tested information, the provision of technical assistance and training, and a series of problem-solving activities in local schools. In order to develop a general model to guide an examination of the effects of these strategies on school improvement outcomes we have consolidated the results of:

- a review of approaches to the study of educational change;
- an elaboration of the nature of the RDU intervention strategies and their hypothetical relationship to each other and to school improvement outcomes; and
- initial empirical observations of activities in the RDU projects and schools.

Such a consolidation was necessary for several reasons. The RDU program represented an ambitious and complicated effort. In it were melded several intervention strategies, not all of which were fully articulated at the time of the program's inception. Thus, the first steps in our inquiry were to specify the nature of the strategies that characterized the RDU intervention and to array these empirical descriptions of RDU services within a framework of existing theories about how best to produce change in schools. In the remainder of this chapter, we review some of the dominant approaches to the study of educational change, and we present a model that shows how the RDU program may be understood within that context. We then discuss how the remainder of this volume addresses the issues raised by the model for an investigation of impacts of RDU upon school improvement and knowledge utilization outcomes.

APPROACHES TO THE STUDY OF EDUCATIONAL CHANGE

The proliferation of both theoretical and empirical studies of educational change indicates that this topic has become one of the most popular research issues in education today. At present, however, we are beginning to see the emergence of two distinctive streams of research, each of which is characterized by certain strengths and deficiencies. The two approaches may be called the "Strategies of Change" perspective and the "Innovative Organizations/Natural Systems" perspective. These are discussed briefly below by showing the commonalities and differences between them.*

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*Clearly the two perspectives do not encompass all current theory about organizational change. However, they do represent two of the most prominent perspectives. For a discussion of a broader set of theoretical viewpoints on educational change, see Louis, Kell, Chabotar and Sieber (1981), or Clark, McKibbin and Malkus (1981).

Strategies-of-Change Perspective

Recent research and theory associated with the strategies-of-change perspective are directly linked to the issues and problems of dissemination, knowledge utilization and school improvement. The emphasis in this research is on varying approaches to stimulating change within schools, particularly through planned organizational change (Bennis, Benne and Chin, 1969). What sets this tradition apart from those studies and models that we have classified as "innovative organizations studies" is the emphasis on how external and internal actors, in concert, may affect change.

One of the precursors of the works within this group was the review of the literature relevant to the problem of dissemination and utilization in education produced by Havelock (1969). This review provided policy makers and researchers with a compendium of concepts and variables related to the development of a system in education modeled after the agricultural extension program. In such a system, human agents would assist potential adopters of externally developed innovations by translating research results into suggestions that were suitable for the adopter. The three traditions in the study of dissemination discussed by Havelock (and some subsequent reactions to them) include:

- The Social Interaction Perspective. This perspective focuses on the adoption of specific new practices by individuals. The explanatory variables most frequently examined include individual characteristics of the adopter, or the individual's relations within a social network of peers (Rogers and Shoemaker, 1971; Coleman, Katz and Menzel, 1966; Carlson, 1965). This body of literature provides a sophisticated set of concepts and variables which may be related to the adoption process, but provides little insight into factors outside of a delimited social system which might influence innovation. Another limitation of studies of the diffusion of new practices is that they have been almost exclusively concerned with the adoption of a single, highly visible product such as a new drug, or a new hybrid corn.

- The RDDU Perspective. The "research, development, diffusion utilization" (RDDU) model is derived from the vertically integrated systems of R&D found in highly rationalized military and industrial concerns (Brickell, 1964; Havelock and Benne, 1969; Guba, 1968). The adopter, whether s/he is a member of the same organization or is located in another context, is viewed as rational; when presented with a "good" innovation, s/he will tend to use it. In addition, s/he may also be seen as powerless to resist following suggestions even if s/he does not immediately perceive their benefits (McDonald, 1971; Sieber, 1972). Such a marketing model is essentially one of bureaucratic innovation, where those at the top are assumed to know what the client practitioner should be

doing. The macro view of the innovative process is useful in drawing attention to all the institutions that must interrelate in order to develop a dissemination system. It suffers, however, from a bias toward the needs of administrators of such programs, and a view of the practitioner as a "helpless functionary" (Sieber, 1972).

- The Problem Solver Perspective. The problem solver perspective has the strongest theoretical base of the older traditions, emerging from the work of Lewin and the research on group problem solving pioneered by the Institute for Social Research and the National Training Laboratory. The problem-solving model focuses on the individual or group that is in the process of changing (Lippitt, Watson and Westley, 1958; Fullan, 1972). The change process is seen as a series of stages. The number of stages articulated by researchers within this tradition varies widely from study to study, but usually begins with a user recognition of a need for change, followed by some examination of alternative solutions to the problem, and the selection and implementation of a solution. While this tradition has often been criticized for its highly rational approach to change (Berman and McLaughlin, 1975), the approach itself does not assume individual rationality, but rather it assumes that improved problem-solving processes will increase the match between the actual problems and the implemented solution.

Havelock (1969) has noted that each of these traditions is, in itself, inadequate as a model for either the design or study of systems to increase information use or the adoption of new practices in education. He proposed a synthesis of the three approaches, and the development of a single linkage model that incorporated elements from all earlier models. One of the main features in Havelock's synthesis was a prescription to involve the client system in defining the need or problem that required information. He assumed that a system of linkages which involved the client as a partner in the dissemination and utilization process would be most likely to result in change and actual use of research results. Another main element in the linkage model is the role of a field or linking agent. Field agents have been incorporated into a wide range of programs designed to improve social services in many fields (Rogers et al., 1976; Glaser and Becker, 1974). Individuals in such roles can contribute to improved problem solving in several ways, including:

- facilitating the transfer of information;
- delivering technical assistance;
- facilitating the decision-making process by clarifying goals and providing leadership; and
- mediating among autonomous and sometimes competing organizations whose resources and services must somehow be coordinated.

Some of the major empirical works within the strategies of change tradition that postdate the original Havelock synthesis are Havelock's extensions of the linkage model (Havelock and Lingwood, 1973; Lingwood and Morris, 1976), the development of the Concerns Based Adoption Model (CBAM) at the University of Texas (Hall, 1974; Hall et al., 1973) the Study of the Pilot State Dissemination Program (Sieber, Louis and Metzger, 1972; Louis and Sieber, 1979), the evaluation of the National Diffusion Network (Emrick, 1977) the Study of the League of Cooperating Schools (Goodlad, 1975) the study of successful technical assistance groups (Moore et al., 1977) and the study of OD programs in schools (Miles et al., 1978). The major emphases of these studies have been upon:

- illuminating the interactions between external agents and school innovators;
- examining the impact of external agents on the school at various stages in the change process;
- examining the organizational structures that are necessary to support linkage arrangements;
- identifying mechanisms, including linkage roles, for overcoming barriers to cooperation between schools, school personnel and knowledge providing organizations; and
- identifying organizational or individual characteristics which promote the development of "temporary problem-solving systems."

Strategies-of-change theorists also emphasized the importance of multiple stages in the problem-solving process. The following four-stage model, where two of the stages are divided into substages, is a consistent representation of most conceptual frameworks (see Havelock, 1969; Rosenblum and Louis, 1981). The four stages are:

- Problem identification
- Problem refinement
  - consideration of alternative solutions
  - solution selection
- Implementation
  - planning for implementation
  - implementation
- Incorporation

These stages of the problem-solving process imply a rational, linear model. However, these stages are also consistent with nonlinear problem-solving approaches, which often characterize school change efforts (Sieber, Louis and Metzger, 1972). An example of this nonlinearity is shown in Figure 2-1. Note that the figure does not imply that all problem-solving processes begin with problem identification. For example, a school may enter a problem-solving process by attempting to implement a new program which has been selected--not because it is intended to solve a problem, but because it has been mandated by the superintendent, or because it represents a new approach that the principal learned about in a graduate course. If the attempt at implementation reveals a poor match between the school's needs and the innovation, this may, in fact, motivate the school staff to begin to analyze what the real needs are for new programs.

Strategies-of-change researchers emphasize a specific set of change outcomes. This approach tends to identify organizational health or generally improved organizational functioning as a desired end state. Thus, for example, outcomes that may be measured include the quality of the change process itself, the alleviation of the problem that stimulated the attempt to change, or the improvement of the school's ability to become adaptive through the incorporation of improved problem-solving practices.

An examination of recent reviews of the strategies-of-change literature (Louis and Sieber, 1979; Paul, 1977; Lieberman, 1977) reveals several theoretical deficiencies in this approach.

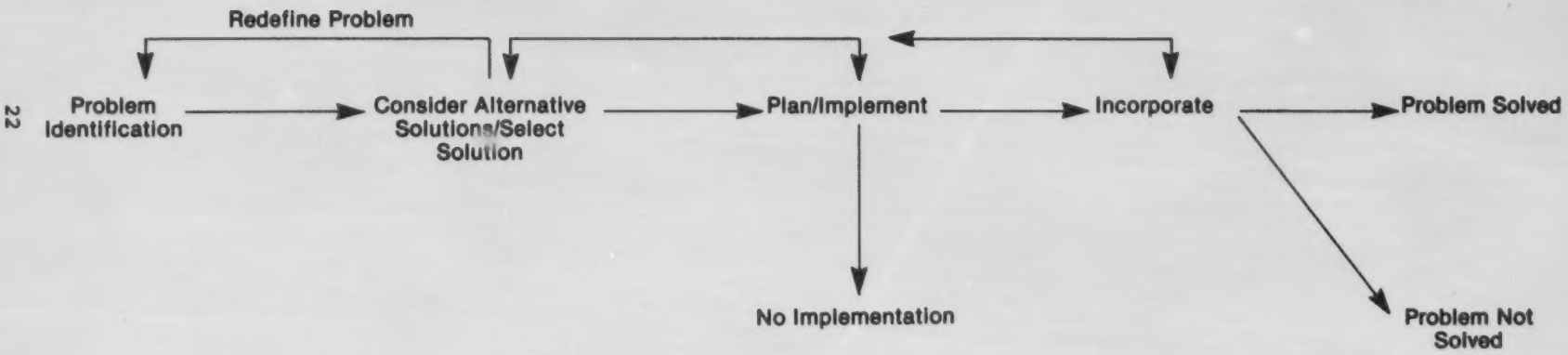
- A true synthesis, as envisioned by Havelock, has failed to emerge. Each study tends to generate its own hypotheses or variables de novo, and there is frequently little attempt to relate findings to a more general model of change strategies.

- As pointed out by Berman and McLaughlin (1975), Yin et al. (1976), and Gross et al. (1971), primary attention has generally been given to the relationship between the external agent and the client, and the initial adoption of an innovation. Less attention has been paid to the later stages in the change process, including implementation and incorporation.*

- There is a lack of conceptual commonality evident when examining the roles of external change agents. A variety of theoretical typologies of linking roles exists within the literature. Examples include the work of Sieber (1972), Havelock (1969), Corwin (1977), Miles (1977), Butler and Paisley (1978), and Griffin and Lieberman (1974). There is, however, no generally accepted set of dimensions regularly found across these various models,

*Note that even the NDN evaluation (Emrick, 1977) which developed an elaborate set of measures of implementation does not analyze the outcomes of the program in great detail. Rather, the emphasis of the study is upon describing program tactics that are associated with implementation.

FIGURE 2-1
The Problem-Solving Process



even though some variables form the basis for several theories. In addition, despite the critical nature of the role, there is a lack of empirical knowledge available to help policy makers with the task of organizing the roles and improving the effectiveness of the individuals who staff them (Lieberman, 1977).

- Little systematic attention is paid to the user context, as opposed to the strategies of intervention. Since the strategies tend to be associated with particular change efforts (the Pilot State Dissemination Project, the National Diffusion Network, the League of Cooperative Schools), the lack of systematic attention to organizational variables at the client level limits the usefulness of the studies for generalizing to a broader model of organizational change.

- Critiques also include a broader concern that, on the whole, the writers concerned with the management of change have not adequately attended to theoretical warnings about the relatively chaotic environment in which the process of change occurs. These include the "garbage can" or "organized anarchy" perspectives (March and Olsen, 1976; Sproull et al., 1978) and the "evolutionary" perspective (Farrar, DeSanctis and Cohen, 1980). These theories of organizational chaos have considerable relevance for the development of a better understanding of how and when change can be managed in particular settings.

In summary, despite the promise of the early 1970s, only limited progress has been made in developing the "strategies of change perspective." While useful case studies continue to be produced, increased opportunities are needed for comparative studies of intervention in schools.

Innovative Organizations/Natural Systems Perspective

In contrast to the "strategies of change" studies, the "innovative organizations" approach limits its inquiry to the study of change which is initiated in the absence of a collaborative relationship with external organizations or individuals, such as the one characterized by the RDU program. In fact, some studies falling into this perspective deemphasize the importance of external stimuli other than the availability of funds. The major focus of inquiry among this growing group of studies is upon the importance of the user context and upon finding correlates of change.

Among the major variable groups that are often included in such studies are:

- structural features of the organization, including size, complexity, formalization, structuring of decision making (centralization), and "loose coupling";

- characteristics of the school's "technology," such as the degree of individualization, curriculum focus, or special staffing arrangements such as team teaching;

- organizational climate, including morale of staff members, administrative support for innovation, levels of conflict, and past innovativeness;

- characteristics of organizational personnel, such as training experience, and professionalism;

- characteristics of students, or other clients, such as racial composition, or achievement levels; and

- characteristics of the organizational environment, such as region, wealth, or political context.

Major recent studies in this tradition include: the Rand Change Agent Study (Berman and McLaughlin, 1977); the study of Organizational Influences on Educational Innovations (Deal, Meyer and Scott, 1975); the study of adoption of innovations (Baldridge and Burnham, 1975); the Teacher Corps Study (Corwin, 1973); the Rural Experimental Schools Evaluation (Rosenblum and Louis, 1981); and the Daft and Becker (1979) study of innovation in high schools.

The innovative organizations perspective has contributed in a major way to our understanding of innovation, largely by identifying features of the organization which help to explain why some organizations appear to be always on the cutting edge of innovation, while others constantly fail to respond to new ideas or procedures that are developed from cumulative knowledge about learning and educational processes. In addition, because of the use of large-sample survey data, such studies have been able to cut through some of the conventional wisdom surrounding organizational change, while confirming other principles that have been developed by earlier case study approaches. For example, early sociological research contended that large bureaucracies were inherently nonadaptive and resistent to change; innovative organizations research has shown, however, that larger and more complex organizations appear to be more adaptive than smaller ones, largely due to the existence of slack resources to support change efforts, and to their greater decentralization of decision making. Perhaps the major contribution has been to identify some of the features of the organization and its environment which condition change, and which make a purely "rational" model of change inappropriate (Berman and McLaughlin, 1975; Downs and Mohr, 1976; Eveland et al., 1977).

In particular, the research into this general category has explicitly pointed to the fact that the context in which change is being introduced will have extremely powerful impacts upon the outcomes of the innovative process. As Greenwood et al. (1975) pointed out, researchers interested in educational change must "go beyond the details of the innovative project, and incorporate characteristics of their setting--the complex organization."

The finding that structural features of the school and its context will affect the outcomes of change programs is an extremely important one, for it points to the limits of most externally funded change programs. Many school characteristics, such as size, complexity of staffing arrangements and staff characteristics, and climate factors, such as general morale, are relatively difficult to alter even under the most ideal circumstances and the richest array of resources. Community contextual variables, or student characteristic variables, are virtually nonmanipulable. The expectation that a categorical grant program, or even a more intensive intervention utilizing external expertise, might change these characteristics in directions which may better support change is unrealistic. These variables might, for example, help to explain the 75% attrition rate that occurred between the awareness and adoption stages of the NDN program (Emrick, 1977).

Another recent contribution of the innovative organizations approach has been to suggest features of organizational design that must be taken into consideration when change strategies are developed. Emerging from the innovative organizations approach is the notion that the effectiveness of different change strategies themselves might vary between organizations with different types of structures. (See Firestone, 1980.) For example, the concept of "loose coupling" (Deal, Meyer and Scott, 1975; Weick, 1976; Rosenblum and Louis, 1981) refers to the notion that the linkages between educational subsystems are relatively weak compared with other types of organizations, such as those in industry. Deal et al. (1975) have noted that many schools tend to be doubly segmented: classrooms within schools are relatively autonomous and frequently schools within districts are relatively autonomous. The degree to which there is "tight" versus "loose" coupling may have a critical impact on the degree to which change strategies designed at upper administrative levels will actually be implemented at lower levels. This, in turn, suggests that different change strategies may be needed in different types of schools or districts.

A major strength of the innovative organizations approach is that it tends to stress as outcomes the critical question of whether there is any objective evidence that change has taken place in the school. Until recently, emphasis was placed primarily on the adoption of new programs, but recent studies have begun to examine the degree to which programs are actually <u>implemented</u> as planned (Berman et al., 1974; Yin et al., 1976; Fullan and Pomfret, 1977). As many have pointed out, perceived implementation of an education program may not reflect real changes in the school (Charters and Pellegrin, 1973).

Studies have also begun to examine the persistence of programs over time, or <u>incorporation</u>. Incorporation represents the stage where new programs or processes are so completely established in the school that they are no longer innovations. Recent evidence from the Rand Study (Berman et al., 1974; McLaughlin, 1976) and the Rural Experimental Schools project (Rosenblum and Louis, 1981) (both of these were studies of programs where outside funding was a major stimulus to innovation) suggests that implemented programs are fragile, and are frequently dropped or diverted even before the end of the funding period. While federal funds are clearly a stimulus to participation, the level of funding is not significantly related to either program effectiveness or incorporation (Berman and McLaughlin, 1977). Since

we suspect that most program changes in schools do not receive significant external financial support, there is reason to pursue further the study of factors that affect incorporation.

Despite its strengths, the innovative organizations perspective has recently received some very serious criticism from previous supporters. Among the deficiencies cited are:

- lack of attention to processes of change, which may contribute to levels of implementation;
- lack of attention to the characteristics of the innovation particularly the organization's perceptions of the characteristics of the innovation;
- undifferentiated conceptualization of the organization, which does not take into account variations within organizations (some types of decisions may be centralized, some may be decentralized) or changes over time; and
- a tendency to rely on cross-sectional surveys, which inherently limit the ability of the studies to address issues such as those mentioned above.

In addition, it is important to note other weaknesses of the approach when it is viewed in the context of policy research:

- In general, there is no attention to the types of variables that have been fruitfully examined in the strategies of change research, or in the older traditions of dissemination/diffusion research, such as social interaction or organizational choice.
- In their desire to find constant predictors of organizational change, there has been a tendency to deemphasize policy manipulable variables or managerial questions in favor of looking at static predictors.
- Conclusions and generalizations are often phrased at a level of generality that is too vague to be helpful (e.g., "A strong principal role is important.").

As Downs and Mohr (1976) point out, however, one of the major problems of this approach is the fact that the researchers have not been able to achieve their goal, they have not been able to find a limited set of variables that are associated with change across different organizations in different studies. Rather, we have found that similar variables, similarly measured, have different relationships with implementation when different samples are used.

INTEGRATING THE TWO APPROACHES: A MODEL FOR THE STUDY OF THE RDU PROGRAM

In the previous section we identified two major trends in the study of educational change. Our discussion was not meant to imply that the two perspectives are mutually exclusive, or that none of the studies cited above used variables or addressed issues from both groups. In large measure, this is a matter of emphasis. Thus, for example, we classify the Rand Change Agent Study (Berman and McLaughlin, 1975 and 1977) as falling into the innovative organizations perspective largely due to its more limited emphasis on external influence variables, and to its relatively limited conceptualization of change process variables. The NDN evaluation (Emrick, 1977), on the other hand, did measure organizational characteristics of the schools, as well as tactics, but did not emphasize them in the analysis. Other studies, such as Corwin's (1972) research on the Teacher Corps or Daft and Becker's (1978) study of high school innovations are more balanced in including and analyzing elements of both perspectives.

Two points that have emerged from our discussion should be emphasized. First, both the "innovative organizations" and the "strategies of change" approaches have certain theoretical weaknesses as well as certain important strengths. Second, the findings of several important studies of recent federal change efforts indicate that each perspective can contribute in major ways to our understanding of change and innovation in education.

It is also important to emphasize that our understanding of educational change, although considerably more sophisticated now than it was five years ago, is still quite limited. Mann (1976) summarized the dilemma by stating:

> Programs were planned, curriculum was developed, teaching/learning units were packaged, teachers were trained, and the results were frustrating, uneven, unexpected and temporary. What happens inside the school, at the service delivery level, is absolutely related to our success or failure, yet the gap in our knowledge about implementing change in the schools is formidable. (p. 313)

In order to begin the task of developing a better understanding of the process needed for the dissemination of knowledge to improve local problem solving, it is essential to synthesize existing streams of research. One of the ways in which this can be accomplished is to incorporate in this research sets of variables emerging from the two traditions that have been shown to be powerful in their ability to explain the complex phenomena under study. Such an integration should draw upon both the explanatory or independent variables that have been utilized as well as upon the differing definitions of what constitutes appropriate outcome measures of success within change programs.

In addition to drawing upon variables that have already been defined, a synthesis should also attend to some of the conceptual weaknesses in each approach that have been described above and that are not fully addressed by other approaches. The development of a model to guide the study of the R&D Utilization program provided an opportunity both to complement and synthesize

the knowledge acquired from other efforts in dissemination and educational change. This opportunity emerges both from the nature of the program and the design of the research based on the program. On the one hand, the R&D Utilization program incorporates in its structure elements of a strategies of change approach including:

- the field agent function;
- the packaging and dissemination of information;
- the provision of technical assistance in problem identification and solution selection;
- the provision of technical assistance in the implementation of a solution;
- explicit attention to the stages of change; and
- active involvement of the client system in the process.

On the other hand, as is strongly advocated by the innovative organizations/natural systems approach, a study of the R&D Utilization program must also take into account the importance of local conditions and problems. Thus, the study must consider the importance of the nonmanipulable and manipulable school context, the strategies and tactics of change, and a complex operationalization of outcomes. Although this study cannot deal with all the potential variables pertinent to the change process, it can bring together many of the issues and thereby complement what has been learned from other program efforts.

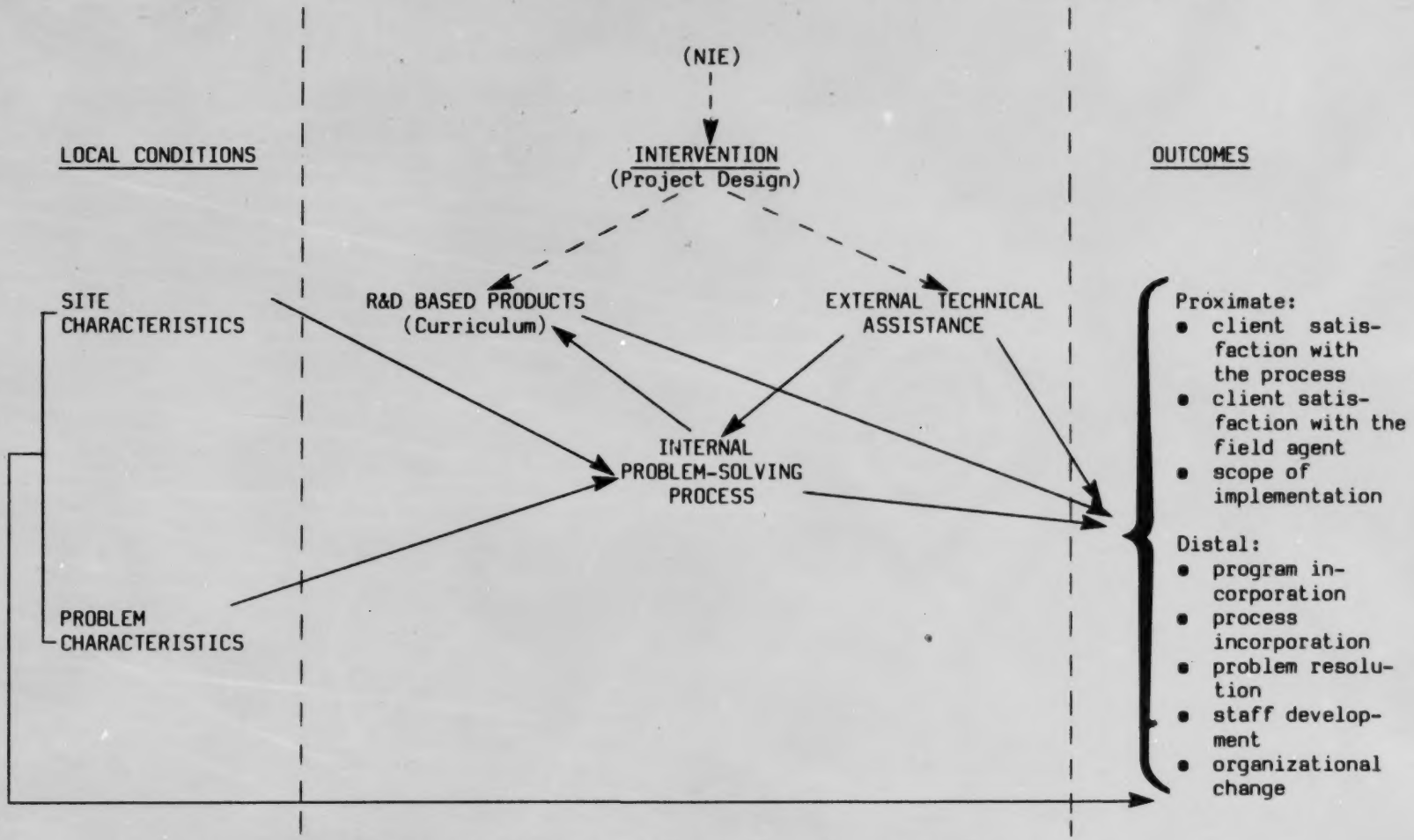
Put simply, we believe that it is important to strive toward a set of models of educational change which take into consideration some of the major contingencies that appear to condition planned innovation. However, given the complexity of the educational system, and the range of innovative activities that schools and school systems engage in, it seems fruitless to continue with the hope that additional research projects will produce a single model that is capable of parsimoniously explaining the innovation process and its outcomes, and is also sufficiently detailed to provide insight to managers of change, whether principals, superintendents, or field agents. Rather, it seems more likely that progress will be made by developing contingency approaches that can identify distinctive and different patterns of innovative behavior that may occur in different circumstances, and for different outcomes.

A general schema which has guided the study and analysis of the impacts of the RDU program is displayed in Figure 2-2. This model is divided into three sections:

- local conditions, which include concepts and variables derived largely from the "innovative organizations" tradition and which are based on the assumption that local characteristics and the problem context condition and interact with external interventions and local decision-making behavior;

FIGURE 2-2

A SCHEMA FOR EXAMINING THE IMPACT OF KNOWLEDGE UTILIZATION ON LOCAL SCHOOLS*



*Lines and arrows represent hypothesized relationships which are reported in this volume; dotted lines and arrows represent hypothesized relationships which are discussed in other reports of the RDU study (Corwin, 1980; Louis and Rosenblum, 1981).

- intervention strategies, which map the RDU approach onto the "strategies of change" tradition, and which categorize the strategies employed by RDU into three different types --information, technical assistance and an internal problem-solving process; and

- proximate and distal outcomes, both those intended by NIE and/or the projects and those unintended.

This simple schema was derived not only from a synthesis of the research literature and concepts noted above, the design of the RDU program, but also from initial observations in the RDU schools and projects. Early visits to the seven RDU project headquarters and a sample of nine schools in the RDU program enabled us to understand more completely the nature of the intervention (in particular, that there were three components including the internal process activities). We were thus able to derive insights about the interactions between the components of the intervention (i.e., the direction of the arrows in the model), and to discover that intended program impacts (i.e., adoption, implementation, and incorporation of a new program or practice, plus engagement in and incorporation of a problem-solving process) were accompanied by unplanned spin-off effects, such as staff development and organizational changes. We now turn to a brief description of the elements in the schema and the relationships between them, beginning with the intervention strategies.

The Intervention

The RDU strategies for change included three project design features, each of which was presumed to have a direct impact on school improvement outcomes. The first two of these were most heavily influenced by the particular design of each of the seven projects. First, each project developed and administered a knowledge base consisting of R&D products (largely curriculum innovations) supported by some form of validation or other evidence of impact. These products varied from highly prescriptive curriculum packages for which there were training and support materials available, to simple film strips. Characteristics of adopted products (such as their quality, difficulty of implementation, need for local materials development, etc.) were hypothesized to affect school outcomes.

Second, two kinds of external human assistance were provided to schools through most of the RDU projects: a field agent ("linking agent," "facilitator" or other generalist) who was employed by the project to support the schools in their activities for the entire problem-solving period; and episodic training which was typically intended to assist the schools in implementing their chosen externally developed product, or in supplementing it with materials as necessary. (The role of the external agent corresponds to the role advocated by the linkage model of the strategies-of-change perspective, in which such agents were recommended for their potential contribution to improved problem solving.) The nature, scope and intensity of external technical assistance were hypothesized to directly affect both the internal problem-solving activities and the school improvement outcomes.

A third component of the intervention was the requirement of participation by local school personnel in a variety of problem-solving activities through the various stages of the change process. This feature corresponds to the assumption of strategies-of-change researchers that involvement of the client system is a crucial factor in the success of a change effort. All of the projects attempted to provide structure and criteria for this process, although they had less direct influence on the internal processes than on the external products that were made available or on the external human assistance intervention. The process was, however, an important feature of the RDU approach and several features of the process (including the level of effort, quality of the problem-solving process, and breadth of involvement) are hypothesized to directly affect both the choice of externally developed products and the school improvement outcomes.

Local Conditions

In keeping with the assumptions underlying the innovative organizations/natural systems approach to the study of educational change (i.e., local site characteristics condition the school improvement process as well as the outcomes of a change effort), the model contains two categories of local conditions as independent variables. These are the relatively nonmanipulable site characteristics, such as community characteristics, size of school and district, and types of staff and pupils, as well as the somewhat more manipulable structure and climate of the schools. The model also contains a category called problem characteristics, i.e., the characteristics of the problems that were being dealt with under the aegis of the RDU program. Local conditions are hypothesized to condition the internal problem-solving activities, and to have a direct impact on school improvement outcomes. Much of the literature on educational change asserts that features of the local context (including student body characteristics) are the major predictors of the success (or lack of success) of an intervention strategy, and in fact far outweigh the power of any intervention to affect school change. A major objective of the analysis in this volume is to test this assumption and to determine the relative impact of local conditions vis a vis the power of the RDU intervention strategies.

Outcomes

The final section of the model deals with the intended and unanticipated potential outcomes. This section has been divided into two categories. First, proximate outcomes include client satisfaction with the services delivered and with the process, and scope of implementation of the selected products. These, however, are not viewed as the ultimate potential impacts of the intervention. Ultimate, more distal impacts have been defined in terms of the intended changes--continued use and incorporation of the implemented products, incorporation of the problem-solving process, and resolution of the problem which was treated by the RDU intervention--as well in terms of other impacts which were found to be spin-off effects of the problem-solving effort. These include staff development outcomes and organizational changes.

Our schema for examining the impact of knowledge utilization activities on local schools may appear to be unidirectional or linear, with local conditions on one end, and outcomes on the other. It is important to point out that the schema is merely a heuristic device--an attempt to visually simplify the pattern of relationships that has guided the inquiry and analysis. However, some local conditions and the internal problem-solving activities are expected to be affected by the features of the intervention, as well as expected to be predictors of outcomes. Indeed, many of the outcome variables are really changes in the conditions of local school features. Thus, for example, the intended outcome of "process incorporation" implies changes in the internal problem-solving activities in the school. The outcome of "problem resolution" is another way of saying that the "problem characteristics" (portrayed as independent variables) have been affected by the intervention. Furthermore, the outcome of "organizational change" implies impacts on the more manipulable local site conditions, such as morale, the ways in which decisions are made, and roles and structures within the schools. Since these outcomes represent an altered state within the local site context, they have been given labels under the outcome category, rather than being portrayed in the schema by reversible arrows between the first two groups in the schema.

Overview of the Remainder of this Volume

The remainder of this volume explicates the analysis and findings based on the examination of relationships portrayed in the model (Figure 2-2). Chapter 3 describes the methodologies used in the conduct of the study. Chapter 4 describes the outcomes of the programs and their measures, the interrelationship of the outcomes, and the different categories of "success" in the schools which participated in the RDU program.

The next three chapters present the impacts of the three aspects of the intervention: Chapter 5 describes the analysis of the impact of the product intervention; Chapter 6 presents the impact of external technical assistance; and Chapter 7 presents the impact of the internal problem-solving activities. Chapter 8 describes the impact of nonprogram features, and looks at the degree to which local site characteristics are related to the outcome measures.

Chapter 9 explores previously unexplicated relationships within the model, such as the impact of site characteristics on the internal problem-solving activities, the relationship between external assistance and the internal processes, and the relationship between the internal activities and the characteristics of the chosen products. Chapter 9 also provides a summation of the model, including analyses of such key questions as the comparison of the power of the separate intervention strategies vs. the power of the combined intervention strategies, and the relative impact of the intervention vs. the power of local site characteristics to predict outcomes.

Chapter 10 describes the costs of the RDU approach at the local site level, and the relationship of these costs to the outcome measures. Chapter 11 concludes the volume with a summary of the findings and their implications for educational change strategies.

CHAPTER 3

APPROACHES TO INTEGRATING QUALITATIVE AND QUANTITATIVE METHODS IN THE RDU STUDY

INTRODUCTION

The methods that were used to develop a data base to study the impacts of RDU at the school level were complex, and in many ways relatively unconventional. The purpose of this chapter is to not only describe the various data sources that were available to us, but also to place our methodological approach in a broader context of debates about how best to conduct policy and evaluation research. In particular, the chapter will emphasize our persistent attempt over the course of studying dissemination, knowledge utilization and school improvement in the RDU program, to take advantage of some of the strengths of both traditional qualitative and quantitative methods.

METHODOLOGICAL DEBATES

For the past 30 years, it has been common to refer to the existence of two distinctive "paradigms" governing the methods of social science enquiry. The first paradigm stresses the need to apply research design and analysis principles derived from the "hard" sciences, and emphasizes the desirability of experimental or quasi-experimental design and statistical analysis. A second paradigm argues that social phenomena are essentially different from those observed by the hard sciences and that, in order to understand them adequately, we must understand the ways in which they occur naturally, and their meaning to members of the social structure. A "holistic" understanding of human social structures and behaviors requires a qualitative, observationally based methodology rather than experimental manipulation and analysis of a select number of variables. As recently as 1977, one observer of these two camps commented that the gulf between them was so great that it was unrealistic to assume that there would be any "grand synthesis" in the foreseeable future, and that any steps toward synthesis were on the "fringes" of paradigms (Rist, 1977).

However, there are a number of indications that a need for something more than simple detente between the camps is growing. Some experimental methodologists, for example, have recently taken tentative steps toward acknowledging not only the existence of an alternative paradigm, but also its suitability for studying phenomenon which have typically been dominated by quantitative approaches (Campbell, 1974; Cook and Cook, 1977). Similarly, researchers who are advocates of qualitative methods have also called for greater attention to standardization of analysis procedures (Sieber, n.d.). Finally, a number of key articles and books have advocated integration between qualitative and quantitative methods within the same study (Sieber, 1975; Lazarsfeld, 1976; Cook and Reichardt, 1979). The expressed need for integration is not occurring only at the fringes of social science disciplines, but is also supported at the center, and is becoming more widespread. The tidiness of the divisions between camps is clearly breaking down: one can no longer assume that an anthropologist is totally ignorant of statistics, and traditional experimental psychologists are hotly discussing

the problems of small N designs for which preferred statistical techniques are inappropriate (Herson and Barlow, 1976; Krachtowill, 1977).

The movement toward integration between qualitative and quantitative methods has been fostered most evidently in social policy research for several reasons. First, some of the early high aspirations for quantitative social policy research were deflated by an accumulation of "null" findings, and "black box" research designs were unable to reveal why apparently massive experimental treatments should produce no measurable effects. Thus, committed empiricists began to look at qualitative research methods as an approach that might help them to improve their analyses--either to lead them to interaction effects that should be explored, or to allow them to account for otherwise inexplicable findings, or to help them in other ways.* Other researchers, such as Gross et al. (1971) or Charters and Pellegrin (1972), raised the question of whether or not a treatment had actually been implemented as part of an elaborate experimental or quasi-experimental design. These studies also indicated the difficulty of determining the degree of implementation without some qualitative understanding of what constituted implementation for a given program.

Second, the most rigorous and sophisticated of designs has not eliminated doubts about the durability of policy research findings. Rather than eliminating controversy over the results of social policy and evaluation research, rigorous designs have simply added new questions for debate. Any observer who does not like the results of a major policy study can almost invariably find a variety of methodological or analytic flaws which can be claimed to undermine its validity. Not surprisingly, some policy makers have arrived at a deep-seated skepticism about the durability of supposedly "hard" findings--at least where they are unsupported by qualitative data which make sense in the light of ordinary knowledge and experience (Corbett and Firestone, 1980; Sundquist, 1978).**

Third, there are also practical considerations which have promoted the use of qualitative methods. The increased need for "forms clearance" procedures that are required before standardized data collection instruments can be used under federal contract regulations should not be underestimated as a burden, both for federal agencies and researchers. Since forms clearance can take from four to six months, the federal agency that asks for qualitative data in addition to quantitative data can begin to "know" something about the topic in question long before a survey or testing program begins. Thus, particularly in cases where there is only limited interest in a "bottom line" assessment, qualitative approaches may be perceived as more efficient.*** Qualitative designs may also be viewed as more flexible in

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*See Sieber (1975) for an extensive discussion of the ways in which qualitative research can be used to complement a design which is predominantly quantitative.

**That policy makers have come to view "soft" approaches as fruitful is evidenced by the significant increase in the number of RFPs from a variety of agencies which require qualitative or case-based approaches rather than (or in addition to) quantitative ones.

***That field-based methods are now viewed as efficient is an ironic turnabout from earlier periods when "public opinion" surveys and other survey data collection activities were touted because of their speed and and low cost.

responding to changing policy contexts and questions than traditional experimental designs.

It should be emphasized that the pressures cited above do not simply describe a shift in emphasis from one camp to another; rather they illustrate a desire on the part of policy makers (and at least some researchers) to draw upon the best of both methods. Despite the increase in policy makers' support of qualitative research, there continues to be limited interest in sponsoring true ethnographic case studies, except in the context of supplementing very large, well defined social experiments (see, for example, Trend, 1976; Herriott, 1980). The new emphasis upon qualitative methods does not seek a paradigm shift; rather it retains the strengths of quantitative research--generalizeability of results, reliability of observations, and the ability to synthesize a large, complex study in a brief report. Increasingly, there has also been a strong perceived need to address the integration of findings across different methodological approaches in a more formal way.

THE STUDY OF RDU: METHODOLOGICAL APPROACHES

The major distinctive characteristics of the methodological approach used in this study are:

- the merging of qualitative and quantitative data within as well as across sites;
- staffing patterns which involve senior researchers who participate in both quantitative and qualitative aspects of the study;
- persistent attempts to triangulate data sources and interpretations; and
- cyclical interaction between the qualitative and quantitative method during all phases of the study, including sampling, instrumentation, data collection, analysis and reporting.

Each of these features of the approach, as they were developed in the study of the R&D Utilization program, will be discussed briefly below.

Program and Research Context

Like many demonstration efforts, there were delays in funding the research component of the RDU program. NIE was, however, particularly anxious not to lose data on the early development of the program, and therefore funded a regional laboratory to perform some data collection during the first months of the program. NIE also encouraged each of the seven demonstration projects to design relatively elaborate data collection systems, and funded them to hire researchers to write a total of 42 case studies about particular sites, which were site specific and relatively unstandardized.

Abt Associates proposed in 1977 to supplement the existing data collection activities with two waves of survey data collection that would tap cross-site issues during early and later stages of implementation. The

agency, however, expressed a preference for conducting a single survey, and asked the research staff to consider alternative ways of providing longitudinal analysis of the process of change in schools. With NIE support the research staff developed a design that, while initially considered far from ideal, finally produced a data base that allowed effective integration of qualitative and quantitative data across approximately 90 local sites involved in the program.

In the study of the R&D Utilization program the emergent interactive design was in large measure a by-product of external features of the study context. At the time, many of these constraints were perceived as albatrosses by the research staff who, when initiating the study, had a marked preference for the sequential model described above. However, in the process of coping with external constraints, problems with availability of data and data quality, a great deal was learned about how to maximize the utility of different approaches, "found" data, and both ad hoc and systematic information. In other words, the design that emerged is robust against many of the "normal crises" which occur in field-based policy research. The specific elements of the design are discussed below.

Key Data Collection Strategies

The study of RDU impacts at the school level used three major data collection strategies: a survey of teachers and principals, unstructured case studies, and "standardized case studies." In addition, several supplementary data sources are used in analyzing program effects at the site level. Each of these approaches are described in greater detail below.

Survey of Teachers and Principals. A mailed survey of teachers and principals in schools that had not officially "dropped out" of the program was conducted in the Fall of 1979, after the end of the operating program of the seven RDU projects.* In five of the projects (Pennsylvania, the National Education Association, the NETWORK/ Consortium, the Northwest Reading Consortium and Florida), the survey was sent to the universe of principals whose schools had been in the project for at least two years. In Michigan, only 18 of the 51 districts involved in that state were eligible for the survey. These sites had been sampled prior to our participation in the study as a manageable number from which to collect data in this relatively large project, which involved 49 schools.**

In both Michigan and Georgia, where in many cases the entire district was a target for intervention, a single school within each district was sampled. In each case, the school recommendation was made by asking a knowledgeable participant (a project employee or a district employee in some cases) to identify a school that had actually received services under

*Approximately 10% of the schools that initially agreed to participate dropped out. Dropouts occurred so early in participation, however, that it was deemed inappropriate to send these ex-participants a questionnaire about events that occurred two years previously.

**The sampling criteria for the 18 were purposive rather than random, and attempted to reflect the variety of different problems and types of sites in the project. Sampling was carried out by the High/Scope Educational Foundation in Ypsilanti, Michigan.

the program and was implementing (or had considered implementing) a school-based product. In both Michigan and Georgia, there is a known sample bias toward schools that were somewhat more involved in the program. This was considered appropriate because it matched the strategy of these two projects of allowing the district to determine which schools should receive services under RDU. Thus, the schools in these two projects were more comparable to those of the other five projects, in which pre-targeting of service delivery by the project was more typical.

Survey administration was carried out by AAI's Survey Research Group. The survey form was mailed to 199 principals, and returned by 152 after two follow-up letters and a phone call. This produced a return rate of 76%.* In the case of teachers, each project assisted us in generating a list of all the teachers in the sampled schools who were eligible to use the product that was adopted (or being considered for adoption). The potential user group varied from the entire faculty in most elementary schools to the members of a single department in some larger high schools. In each instance, we sampled the universe of "potential users" if the number in the school was less than five. Where it was greater than five, we randomly sampled five teachers to whom questionnaires were sent. Procedures for questionnaire administration included two follow-up letters, but did not include telephone calls. 1246 questionnaires were sent out, and 594 returned with a final return rate of 48%. A detailed breakdown of return rates by project is presented in Table 3-1. The table indicates that return rates were lowest in those projects (CEDISS/Michigan, Georgia, and NEA) where teacher and principal participation was known to be lowest. Follow-up phone calls affirmed a bias favoring respondents who were more actively involved in implementation.

Copies of the questionnaire instruments are presented in Appendix D.

Case Studies. As noted above, part of the pre-existing design for the study, which was developed before our participation, was a set of 42 "site case studies" which were written under contract to the seven RDU projects. In most cases, the projects delegated the responsibility for preparing case studies to another individual or set of individuals. In Michigan, for example, the case studies were prepared by staff members of the High/Scope Foundation. In Florida, all six case studies were prepared by a professor at a state university.

In a few cases, a project staff member--the project evaluator--wrote one or more case studies. In the Northwest Reading Consortium case studies involved collaboration between project staff members and staff consultants from the Center for Educational Policy and Management at the University of Oregon. AAI had no direct responsibility for forming the case studies. However, some indirect influence occurred as a result of two conferences for case study writers that we conducted to discuss issues of common concern.

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*The feasibility of conducting telephone interviews was explored. However, it was clear that principals who had not returned the questionnaire had either left the school (11 cases) or were not sufficiently knowledgeable about the program to complete the questionnaire.

Table 3-1

RESPONSE RATES FOR TEACHER AND PRINCIPAL SURVEY

Project	PRINCIPALS			TEACHERS		
	Sent Out	Returned	%	Sent Out	Returned	%
Northwest Reading Consortium	28	19	68%	185	92	50%
Georgia	28	17	61%	119	55	46%
Pennsylvania	17	17	100%	112	68	61%
Consortium/NETWORK	23	21	91%	205	102	50%
NEA	25	17	68%	172	67	39%
Florida	26	23	88%	262	129	49%
CEDISS/Michigan	52	38	73%	191	81	42%
	199	152	76%	1246	594	48%

We also developed a list of issues of interest to us, which we asked the case study writers to use as an index. In general, however, our advice about the content and focus of the case studies was neither sought nor supplied.

The use of case study writers hired and paid by the projects inevitably raises a question of objectivity, both in selection of sites and in analysis and reporting. In most cases site sampling was carried out within the first six months of the RDU program's operations, so that selecting for success would appear to have been impossible. In most of the projects, however, random sampling procedures were not used, and so the possibility of a preference for sites that "smelled like success" cannot be ruled out.* In terms of objectivity in data collection and analysis, the RDU project staff members were deeply respectful of and committed to the research component of the program. In selecting external contractors or consultants, care was taken to choose competent professionals with no ties to the schools that they would be studying. Discussions with individual case study writers lead us to believe that they felt free to write about their sites as they saw them. In addition, the project staff members who were responsible for preparing or supervising the preparation of case studies were also open about negative findings emerging from the cases, as well as positive ones. Interestingly, case studies written by staff members of the seven RDU projects tended to be, if anything, more critical in their intepretations of events and outcomes at the school level than subcontractors or consultants, perhaps because they were more familiar with the ideal models that each project had developed. In sum, we do not perceive that there was any systematic bias favoring data that would point to positive outcomes in the schools that were covered in case studies written under project supervision.

The quality of the case studies as sources of data, on the other hand, was highly variable. The length of cases ranged from approximately 40 pages to nearly 100. While length was certainly associated with the level of detail of the data presented, the degree to which the case contained a convincing, documented, "holistic" portrayal of the school's progress through a problem-solving process was more a function of the skills and experience of the case study writer.

A final major source of data was field notes and site reports based on visits to 51 RDU schools. Nine of these site visits involved one day orientation visits by two AAI staff members very soon after the beginning of the research project. An additional 42 schools were visited for two days by two AAI staff members during the Fall of 1978 and the winter of 1979. Finally, a sample of 21 of these schools were revisited for a two day, one person visit in the Fall of 1979.

The procedure for sampling the 42 schools visited by us involved asking each project to nominate the site which they believed best exemplified what they were trying to achieve, the one which they believed to be least promising, and a random sample of the remaining sites that were <u>not</u> involved in a project-sponsored case study. The 21 follow-up visits were selected

*In one project, an independent contractor eliminated from the selection process sites which the staff believed would be unlikely to become involved in project activities at all. This was the only instance of a clear bias away from potential failures.

based on the degree to which staff members as a group felt that they might illuminate problems and issues in carrying out the RDU process, and thus included both sites that appeared to be highly successful, and some which appeared to be chaotic and of low potential. At least one site with low potential for success and one with high potential was selected in each of the seven projects.

Our approach to conducting these case studies was to draw upon the emerging standardized case method. The main features of the method, as described by Yin (1980 and 1981), are:

- considerable pre-specification of the data that are to be collected in extensive protocols, which include not only questions to be answered, but specification of documents to be collected and at least some of the respondents who must be interviewed or observed;

- built in flexibility to pursue at least some additional topics and interview different individuals from those who are pre-specified if they appear to be locally important to the social phenomenon under study;

- an emphasis upon a unit of analysis that is larger than a respondent, e.g., a social unit, a classroom, a program as it is implemented in a local context, etc.;

- an emphasis upon early data reduction and analysis while in the field, and the requirement of a standardized reporting format which involves pre-identifying at least the majority of issues to be addressed;

- the use of brief, but iterative approaches to data collection. Typically there will be an initial round of field visits, a period of analysis and refinement based on these and a second round to collect data that are missing because of changes in the design and analysis plan, or to observe changes over time (most studies using this approach spend between one and two weeks at a given site); and

- the development of causal arguments within each case and across cases using a direct replication design. The logic of this analytic approach is to find specific phenomena in repeated cases under predictable conditions. Where the N is very small (five or less) the approach will typically emphasize the internal validity of causal analysis within each case; where somewhat larger, the design often looks for systematic replications and attempts to establish the variability of conditions under which a phenomenon occurs.

Some flexibility was delegated to each site visit team in deciding the specific method of writing up a narrative report of site visit observations, although each report was required to address specified topics. The case materials were not, however, written even as rough "cases." Rather, they were more on the order of organized field notes. A typical field report

from a site visit would range from 15-25 typewritten pages, excluding documentary materials. The intent of each field report was to provide primary data for future analyses rather than final conclusions. Site visitors were instructed to limit their "hunches" or interpretations to specified sections of their reports. The development of causal arguments occurred in analysis seminars, which were held after completing each round of field visits, and during which the site visit staff would attempt to develop and defend hypotheses about cross-case patterns using various site visit materials as evidence. These preliminary causal arguments were later expanded into many of the "hunches" underlying the analysis presented in this volume, and into additional case materials and analysis presented elsewhere (Louis, Kell, Chabotar and Sieber, 1981).

One observation that is critical to understanding the standardized case method is the importance of iterative site visits. In many of the 21 schools that were revisited there were important and sometimes dramatic changes over the elapsed time. Some schools that looked like failures had blossomed into successes. Others had undergone a reverse process. In still others, there were many "critical events" which altered the participants' reactions to or feelings about the program and their involvement, and which changed our estimates of the likelihood of more permanent impacts at the school level. In sum, a single visit cannot, in our opinion, provide valid data about a complex organizational process that unfolds over a long period of time.

Other Data Sources at the Site Level: In addition to the major data sources discussed above, there were a variety of additional data sources, some of which were designed and collected by the Abt Associates research staff, and some of which were intended primarily to serve other purposes. Among these were:

- data on the field agencies who served each of the sites. These data were collected primarily through surveys of active RDU field agents, and were intended to contribute to an analysis of field agent roles in educational settings. However, we also intended to examine the relationship between agent role definitions and site performance. (The methodology used for obtaining data from field agents is more fully described in Louis and Kell, 1981);

- data about the design and services that characterized each of the seven projects' strategies for effecting change in schools. These data are presented most extensively in Louis and Rosenblum (1981), but were also intended to be used to determine whether project design and management affected site outcomes;

- various documents and surveys that were collected as a part of the preliminary study carried out by the first [illegible]ation contractor, including demographic data about [illegible] site, and a survey of "key informants" collected at the beginning of the program.

- "event-triggered" reports, discussing different phases of the school's progress through the project, which were management reports to NIE for monitoring purposes;

- a case study writer's survey, which obtained some standardized data on almost all of the case study sites.

- various other documents, provided either by the projects, the site, or other individuals.

MERGING QUALITATIVE AND QUANTITATIVE DATA SOURCES

The study was designed so that each data source could provide different types of information. Thus, the principal questionnaire emphasized information about the characteristics of the school, and about institutionalization of the process and product. The teacher questionnaire emphasized teacher assessments of materials, the process and the impacts of the activities and process on the school. The site visits, on the other hand, emphasized capturing the nature of the intervention at the school level, particularly the major features of the problem-solving process at various stages, and the level of activity of various key actors, both inside the school (principals, teachers, etc.) and outside (field agents and others). There was some overlap in items and topics between instruments, but the strategy was to develop an information "division of labor" based on the knowledgeability of the respondent/observer about certain topics, and the need to develop both site-visit protocols and questionnaires that were not overly burdensome.

Merging Qualitative Data Sources Within Sites: The Consolidated Coding Form (CCF)

Much of the discussion of integrating qualitative and quantitative methods essentially involves cross-site analytic issues. The challenge facing us included the cross-site merger of different data sources, and even more pressing was the problem of a diversity of within-site data sources. One feature of policy and applied research is that it is frequently very "messy." For example, most major programs are not studied simply by one group of "evaluators" or researchers. Rather, there may be internal evaluations, reporting and administrative data collection from the funding agency, and a sequence of external researchers. The multiplicity of research and reporting requirements is a source of major concern to those who are being studied and who may frequently complain that "someone was here just last week asking me the same question." This was a particular problem in the RDU program, where "mini ethnographers," NIE administrative reporting requirements, two sets of external evaluators, and a variety of other researchers interested in the program all descended with regularlity upon the schools involved. This is increasingly a dilemma in other programs as well, such as Title I, IVc, etc.

For any site, our information could include any or all of the data sources mentioned in the previous section. However, in no more than 20% of the sites was a complete data base available, and in most cases major instruments or documents were unavailable. In sum, we had a "missing data" problem of the first magnitude. For example, the generous assumption that

either a case study or a site report could count as "case" data yielded an N of 90 usable "case" sites. (For only 75 of these sites did we have both a teacher and a principal questionnaire.) However, if we looked for specific data--e.g., the level of effort devoted to each phase of the problem-solving process--many of the project-produced case studies had vague information, while most of our own site reports were quite specific. Not surprisingly, given the qualitative, narrative nature of much of the data available to us, non-comparability within a given instrument or data category was often equally severe. Thus, in some instances the "event-triggered" management reports to NIE read like 5-6 page mini-case studies, and were filled with very specific data about what occurred at the site during a particular phase. In other cases, a report on the same topic (sometimes even from the same project) might be no more than a page long, and contain little or no useful information. Yet, despite these problems, it seemed foolish to throw away "evidence" of any sort, particularly in light of the high level of effort that had gone into collecting some of the data that were missing for the largest number of sites.

Rather than analyzing each data source separately, it was decided to combine all data sources for each site in an "intensive" sample (e.g., the 90 sites where we had a usable case study, or which had been visited by a project staff member). This was done by developing a consolidated coding form in which a single score or rating was given for each variable on the basis of a senior researcher's judgment derived from all the possible data sources discussed above (with the exception of the formal principal and teacher surveys). The measures were developed to maximize the completeness of available data. Thus, for example, the standardized case materials stressed precise measures of level of effort devoted to planning and implementation in terms of staff days. The case studies tended to have much less precise measures. Level of effort was, therefore, coded as "high-medium-low," where these were defined as ranges of staff days. Other sample items may be seen in Figure 3-1.

Responding to these site-based questionnaires (which included 240 dichotomous or Likert scale items) was an extremely time-consuming task, and involved between two and three days of reading materials and verifying responses on the coding form. All coding was conducted by core senior staff members, who had made visits to at least four of the sites, and who went through an intensive two-day session in which common interpretations of items were emphasized.*

While the process of "sleuthing" through the data trail for each case did consume a great deal of time, what resulted was a "quantitative" data base for 90 sites, which covered issues that could not be easily tapped through traditional survey methods. These included the "quality" of the decision-making process and patterns of influence of different actors over decisions. Because of the diversity and large number of sites, more traditional forms of data reduction and analysis would not have produced a data base which reflected both the "holistic" knowledge that site visit teams brought to the cases and the reliability of standardized data, integrated

*A copy of the coding form and coding instructions is available in Appendix D.

Figure 3-1

SAMPLE FROM CONSOLIDATED CODING FORM

			CARD 12 (cont.)
103.	In your opinion, to what extent was the faculty as a whole actively involved in the implementation process--i.e., to what extent did the faculty as a whole participate in discussions, making decisions, or carrying out tasks related to the process? (CIRCLE ONE)		
	To little or no extent 01	1 2	24-25,26
	To some extent 02		
	To a great extent 03		
	To a very great extent 04		
	Missing data . . . . . -1		
	Conflicting data . . . . . -2		
	Not applicable . . . . . -3		
104.	In your opinion, how much influence did the faculty as a whole have over the major decisions in the implementation process? (CIRCLE ONE)		
	None or very little 01	1 2	27-28,29
	Some 02		
	A great deal 03		
	Missing data . . . . . -1		
	Conflicting data . . . . . -2		
	Not applicable . . . . . -3		
105.	During the implementation stage, was there a formally constituted group--other than the faculty as a whole--specifically empowered to make decisions or carry out tasks related to implementation? (CIRCLE ONE)		
	IMPORTANT: The group should meet the following criteria:		
	- It must have a label (although this may be informal).		
	- It must include at least two district or school staff.		
	- It must include at least one "potential implementor."		
	Yes 01	1 2	30-31,32
	No 00		
	Missing data . . . . . -1		
	Conflicting data . . . . . -2		
	Not applicable . . . . . -3		
	SKIP TO QUESTION 111		
106.	How many members of the group you described in Section IX were also members of this group? (CIRCLE ONE)		
	None 01	1 2	33-34,35
	Few (less than 20%) 02		
	Some (20-49%). 03		
	A large proportion (50-79%). 04		
	All or most (over 80%) 05		
	Missing data . . . . . -1		
	Conflicting data . . . . . -2		
	Not applicable . . . . . -3		

both within and across sites.* And, while time-consuming, this method was considerably less costly than other alternatives (such as ignoring non-conforming data sources or gathering additional data on site in order to develop more complete standardized case studies).

Staffing

The two cultures of research often result in research designs where staff members are specialists in either qualitative data collection and analysis, or quantitative data collection and analysis. This approach, while appropriate for the parallel model, does not facilitate integration and interaction. The staffing patterns in this study involved having the same core staff of senior researchers involved in all instrumentation, data collection and analysis. Thus, every individual who contributed as a major author or analyst to the study was personally familiar with site processes at all levels, and had responsibility for some portion of the quantitative analysis in the study. Conversely, all site data collection was carried out by individuals with a major role in the analysis. This "integration by staffing" is perhaps one of the most effective ways of ensuring that the cycle of testing quantitative and qualitative observations occurs on a regular basis.

Triangulation and Data Quality

As Webb et al. (1963) have pointed out, qualitative data become more compelling if observations are supported by multiple sources of evidence or observations. The issue of reliability was of deep concern to us, in part because of the rather varied nature of our underlying data sources. Thus, our design involved several approaches to triangulation:

- Inter-observer. Site visits were conducted in teams. Teams were required to reach consensus in preliminary rating of sites on quantitative dimensions. In addition, when using the consolidated coding form, inter-rater reliabilities were conducted.

- Holistic vs. categorical. As part of the interweaving of qualitative and quantitative data, findings from the qualitative data base were repeatedly tested out in the quantitative and vice versa. For example, in attempting to develop a categorical variable summarizing "site success," a definition of success was first discussed among the staff on the basis of the field data visits.** An indicator that reflected these discussions was developed from the survey data of principals and teachers. The 90 "intensive" sites were then categorized, using the quantitative indicator, and staff again discussed whether they were correctly classified, by

*A limited inter-rater reliability check was conducted which revealed an agreement rate of 72%. Several sites were eliminated because of the amount of missing data.

**This variable is described in greater detail in Chapter 4.

using the "holistic" judgements that they developed in the field visits, or by reading the "mini ethnographies."

- Case vs. survey. In several cases, similar measures were built into teacher and principal surveys, and into the consolidated case coding instruments. Correlations between the perceptions of local respondents, and the perceptions of case raters were calculated, and several variables were discarded where correlations were not positive and significant.*

- Survey vs. survey. In all cases we were trying to obtain building-level measures of the process and outcomes of implementing new curriculum and staff development materials. This meant aggregating teacher responses to the building level. In order to ensure that we were not falling into the "ecological fallacy," an analysis of variance between and within buildings, using both teacher and principal data, was performed, which indicated that, for most measures, variability between schools was higher than variability within schools.

- After the latter two activities were completed, measures were scaled to form a single school-level score, reflecting the responses of principals, teachers and the external case material collected by field staff.

Cyclical Interaction Between Quantitative and Qualitative Data

In many multi-method policy research designs, it is assumed that qualitative data will influence quantitative data collection and analysis, but not vice versa (Sieber, 1975). Most discussions of integrating quantitative and qualitative methods also promote integration at one phase of the execution of the study (Smith and Louis, forthcoming). Thus, for example, the sequential approach promotes integration during the period of instrumentation and final design for the "final" quantitative data collection, the parallel approach promotes integration only after all data collection and analysis in the separate streams is completed, and the standardized case approach promotes integration during the process of cross-case analysis. At this time counts and frequencies (or even correlations) are made.

In the RDU study, on the other hand, quantified data were available from a very early point in the study, both because of the surveys that were conducted prior to the award of the contract to Abt Associates, and because data from the first round of field visits were coded while we were on site. The results of early descriptive analysis changed the focus of

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*For a further discussion of case-survey triangulation, see Appendix B.

our qualitative data collection in significant ways, since they highlighted topics where there was little variation between sites (and certain issues that were expected to dominate the qualitative data collection were therefore eliminated). In addition, they suggested some issues to look for--such as the relationship of racial diversity to the process of change--that were not initially picked up by the field visit or case study writers as important. This cyclical interaction between qualitative and quantitative data occurred throughout the study, during staff analysis seminars, and during the construction of instruments at various phases of the study. Cyclical integration stresses the following features:

- Interaction between qualitative and quantitative data in sampling. The interactive approach allows purposive sampling for cases to be combined with random sampling (or sampling of the universe) for survey or other structured data collection. This feature enhances discovery and generalizeability.

- Interaction between qualitative and quantitative data in instrumentation. A constant interaction between qualitative and quantitative analysis procedures produces an iterative approach to instrumentation, both for field data collection and more standardized coding instruments or data collection. Iterative instrumentation would be almost impossible for most standard longitudinal research designs, which involve repeated measures. This problem is avoided in the "consolidated coding" procedure, where repeated measures are reconstructed from a broad evidentiary base.

- Interaction between qualitative and quantitative data in data collection. The development of survey-type instruments for use even in early field data collection forced the research team to seriously think through measurement assumptions at a stage where, in a more typical sequential or parallel study, it would not occur. We believe that this contributed significantly to the quality of our measurement.

- Interaction between qualitative and quantitative data in analysis. In the interactive model, it is impossible to identify a distinct "analysis phase" in the research project. Rather, analysis begins with the first data collection event, and occurs periodically throughout the project. More importantly, however, is the fact that the simultaneous analysis of quantitative and qualitative data by the same staff continuously requires a testing and verification of one data source against another, increasing both reliability and validity.

- Interaction between qualitative and quantitative data in reporting. While some of our reports are more "qualitative" and others more "quantitative," the immersion of all staff in both kinds of data has meant that no report draws solely upon one type of data source.

SOME REFLECTIONS ON THE POTENTIAL STRENGTHS AND WEAKNESSES OF THE INTERACTIVE MODEL FOR SOCIAL POLICY RESEARCH

Since there has been only this one "test" of the approach that we have described above in a major educational study, any assessment of its viability must be preliminary. However, it is appropriate to draw some conclusions about what has been learned regarding the integration of quantitative and qualitative methods in design, data collection and analysis.

Design

Since the beginning of the "evaluation" movement, many disciplinary researchers have complained about the lack of attention on the part of policy makers to designing "evaluable" programs. They further complain about policy makers' tendency to involve researchers too late, and at too low a level of effort, to carry out the optimal research designs (Rodman and Kolodny, 1964; Weiss and Rein, 1969). Unfortunately, most of these pleas have not been attended to because of a variety of reasons which are often beyond the control of the research branches of various government agencies. Thus, as policy researchers, we are typically forced to choose between a research context that is less than ideal, or a situation where we do not conduct research on interesting and significant policy endeavors. The "sleuthing" strategy that characterizes the interactive model is premised on the assumption that the least promising circumstances can yield usable and even exciting data, that almost any piece of information can be turned into a "clue" to understanding the phenomenon in question, and that systematic analysis of clues is important.

The interactive approach should not necessarily be viewed as an ideal research design, for it lacks the elegance or simplicity of a true paradigm. However, it is particularly well suited to addressing some of the realities of policy research context which often cause stresses and strains in more elegant designs. Among these realities are:

- where the study combines both significant exploratory and/or evaluative and hypothesis-testing components;
- where it seems important to have both a "rich" or holistic understanding of a process occurring in a field setting, and a broader cross-case analysis which addresses some of the same issues;
- where the policy audience is composed both of people who prefer qualitative "valid" data, and quantitative "generalizeable and reliable" data; and

- where the field reality is "messy"--lots of previously collected data exist but there is a great deal of variance in quality and depth of information between sites; where response burden is a significant practical or political issue; where resources may be too limited to begin anew with a totally new design; or where the research involves documenting a longitudinal process that is already well under way.

The interactive approach is not a simple one, however, and causes its own problems. It requires constant attention from staff members who are committed, consistent, in-house senior staff, and each of whom is capable of both qualitative and quantitative data collection and analysis. One feature of the approach that should be emphasized is the need to maintain very low rates of turnover among project staff--since the processes of design, data collection and analysis are intertwined, any need to replace a key person involves considerable costs in socialization. In fact, our attempts to replace key staff members during the last year of the project were not at all successful; indeed it became necessary to extend our work over a longer period of time in order to complete the analyses. In addition, it must be emphasized that staff members themselves must be relatively free of paradigmatic preferences. If either the project director or other key staff members are reluctant to become equally involved in qualitative and quantitative analysis, promoting cyclical integration may be extremely difficult.

Data Collection

The wide variety of different types of data collection activities that were carried out in the RDU study allows us to address issues regarding validity/reliability that are often debated among those who are concerned with the increase in multi-site qualitatively based studies.

One of the major informal debates that occurs among qualitative cross-site researchers is the question of how one can best preserve the "holistic" insights obtained in a traditional ethnography with the necessary truncating of time in the field that results when financial resources are stretched to cover many sites. The proponents of the "standardized case study" tend to prefer brief on-site data collection activities which are conducted exclusively by in-house staff members (e.g., a staffing approach that is more similar to traditional quantitative data collection procedures than to the traditional ethnographic field work). The individuals who argue for "mini ethnographies," on the other hand, contend that even a superficial understanding of the functioning of a program, organization, or other social unit in a local setting must involve more time on site and more visits over a period of time, in addition to greater flexibility in observations (Knapp, 1979). Typically a "mini ethnography" approach argues for hiring trained individuals--often consultants--who are geographically closer to the system under study, and who can thus use whatever time is available for observing and interviewing in a way which is more responsive to the unfolding of events at that site.

The study provided an opportunity to assess the "richness" and depth (validity) of data collected using a "mini-ethnography" approach (project case studies) and the standardized case approach (our site visits).

The typical mini-ethnography in our study consumed about 15-20 days of data collection and very preliminary within-site analysis on the part of the case study writer who was, on average, a university professor who came to the job of writing the case studies because of personal interest.* As a result there was, in a number of cases, a great deal of "contributed" time. The typical standardized case study, on the other hand, consumed approximately four-five person days of data collection, which occurred at a single point in time for most sites, but with a return visit for approximately 35% of the sites.** Two-person teams were used (except for the return visits which were conducted by a single person) and they conducted some joint interviews with pre-identified key informants and some individual interviews with teachers and other relevant respondents. The standardized site reports were written by one team member on the basis of a team debriefing and discussion; each case was reviewed by the other team member and augmented where necessary.

On the whole, we believe that our standardized case studies yielded data that were as insightful into local site-specific processes as the more intensive mini-ethnographies. In addition, they were typically far more useful for the purposes of cross-site analysis. In a number of instances, we obtained both standardized cases and mini-ethnographies on the same site. Where there were differences in what was emphasized in each case, in most instances our data were equally detailed, and equally informative about the longitudinal processes of change. In no case where we were familiar with the mini-ethnography sites did we find any major contradictions between the data that we had collected, and the data that were collected through more intensive, less standardized means.

Two conclusions may be drawn from this informal comparison, which was corroborated not only by our possibly biased project staff, but also by several individuals who served as consultants to the study who were familiar with both types of qualitative case data. First, the more costly mini-ethnography does not result in sufficiently better data to justify the additional use of resources (although some [e.g., Wolcott, 1981] would argue that the process of truncating and focusing field data collection and analysis may violate the most basic definitions of an "ethnography"). Second, the standardized case study can reveal local site uniqueness (if the reporting format allows this) and, in addition, is far more useful for cross-site synthesis. Mini-ethnographies are no better at reflecting "holistic" patterns

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*The appropriateness of the background of case study writers for conducting this type of research varied considerably. In addition, some of the 42 "mini-ethnographies" actually used a standardized case approach.

**It should be emphasized that the 4-5 days per site that yielded relatively valid data for our study should not be generalized to other settings. For example, when examining district-wide behavior, it is clearly necessary to have a somewhat larger number of person days than when examining program functioning in a single school. However, the general principal of contrasting mini-ethnographies and standardized case materials still holds. Further, it should also be emphasized that information gathered during the 4-5 days on site was augmented by review of documents prior to and after the visit, and through familiarity with the nature and substance of the intervention gained in interviews with managers at the funded project level and with the external providers of technical assistance.

in a site because they still lack the essential feature of a traditional ethnography: an on-site presence over an extended period of time which involves substantial participant observation in addition to interviewing.

Validity is not the only problem, however. Those who are concerned about the growing use of qualitative cross-site analysis often point to the issue of reliability of field observations as a serious one. This concern may be even greater when one is attempting to address very slippery and non-tangible features of organizational process such as "the influence of the principal over the decision-making process." We believe that the deliberate attempts within the study to compare the data obtained from qualitative methods with more traditional survey methods indicate that, with care, this should not be regarded as quite as serious a problem as has often been thought. With adequate triangulation, and with a stable, sharing staff that is fully socialized in common definitions of the phenomena under study, it is possible to semi-structure the data collection techniques and still achieve high levels of agreement between different sources of data.

Let us take, for example, one of our less concrete measures of school-level outcomes, "overall organizational impacts on the school." After the first round of preliminary site visits, it was decided by the staff that there were many spin-off effects in organization development and improvement that were not, in all cases, directly tied to the implementation of a new curriculum package. These included changes in staff morale, improvement in the image of the school in the community, etc. We then developed a set of Likert scales reflecting side benefits that we had observed, and during our major qualitative data collection we rated all of the schools that were visited on this battery. The battery was also included in the surveys of teachers and principals. While the field staff tended to rate the schools somewhat less generously than indigenous respondents on broad school organizational impacts, the ratings that were given by the field staff correlated .55 with the principal ratings, and .44 with the teachers. These are quite typical of the intercorrelations between data sources that were achieved for items or indices which overlapped.

We were finally able to achieve even greater reliability in our quantitative data set by combining school scores on our outcome variables both from originally qualitative sources (e.g., from the "consolidated coding form") and from survey data.*

Data Base Construction Issues

The major problem faced in constructing a data base from a variety of quantitative and qualitative materials is that of missing data. Missing data, whether through survey non-response, or item non-response within a survey, are always a problem with complex data sets. Even in face-to-face standardized data collection settings, item non-response is an issue where the questions being asked are complicated and difficult to answer. In general, where multiple regression or other analytic procedures employing a large number of variables in an analysis are used, the item non-response problem is handled by simply limiting the data set to items and/or respondents on which a relatively complete set of responses is available. Where multiple data sources are being used, where qualitative data are being transformed into quantitative data, and where the numbers of "respondents"

*For a more extensive discussion of the "quality" of the quantitative data that were derived from various sources, see Appendix B.

(in this case schools) is quite small, the standard approach is simply not feasible. In our case, for example, among the 90 schools on which consolidated coding forms were available, six principals failed to respond because they had actually left the school. When this problem was compounded with item non-response, we quickly realized that any regressions including more than ten variables might reduce the N for analysis from 90 to the low 40s.

Our approach to solving this problem was two-fold. First, we decided that it was necessary to "retrieve" some crucial missing data in the CCF survey through estimation procedures (more detailed description of estimation procedures is provided in Appendix B). Second, we decided to let the remaining item non-response problems affect the Ns in our analyses as they would. Thus, in many chapters, the number of cases included in a table may range from 179 (the N of schools for which we obtained teacher survey data) to 55 (in cases where we can combine data from principal, teacher and CCF sources but in which there is some item-level non-response). The degree to which this "wandering N" affects the generalizeability of our analyses between the small N tables and the universe of schools is discussed further in Appendix C.

Integrating Qualitative and Quantitative Data in Analysis

As has been implied above, one of the main features of the interactive approach is that this analysis does not occur after data collection is completed. Rather, analysis is an incremental feature associated with each site visit, between groups of field data collection activities, before the design of later instruments, and so forth. It was this ongoing process that permitted the research staff, as a group, to arrive at the consensus necessary to develop reliable, holistic cross-site coding schemes, which were the key features around which the integration of qualitative and quantitative data occurred.

The process of trying to quantify our field data while these data were being collected was a key feature of the integration process. A field site team faced with the necessity of making joint assessments about the local site processes on a Likert scale, was also required to clarify their perceptions about the measurement properties of the scale, the phenomena that had been observed, the relative weight to give different respondents' perspectives on the issue in question, and whether the most site-important features were being tapped by the coding instruments. This process, which occurred both in the field and during extensive debriefing sessions with the entire core research staff of eight, ensured that (1) there was a constant press to have quantitative instruments reflect, as much as possible, our more holistic understanding of how sites were operating; (2) a more precise understanding of the site was developed through quantification; and (3) the existence of the quantitative forms continuously pushed us toward the standardization that was necessary in order to conduct a cross-site analysis of a very large number of sites.

In the end, our analysis cannot be said to be either quantitative or qualitative as these terms are traditionally defined. For example, can a data base composed of numbers that are entirely dependent on the iterative, holistic judgements of experienced site field teams be described as only quantitative? While the analysis procedures used to manipulate the data are statistical, the data, and any interpretations of results, are totally

conditioned by their origins. On the other hand, as we approach any given analysis using case materials rather than quantified data, it has become genuinely impossible not to embed that activity in our knowledge of the descriptive statistics and correlational relationships that were available to us well before qualitative data collection had ended.

Many colleagues who have faced the problem of cross-site qualitative analysis with Ns of ten or more, have found it impossible to avoid some quantification of the data. The process of "holistic" analysis appears to break down at some point, and the analyst begins jotting down counts of occurrences of phenomena, possibly even computing rank order correlations, but unquestionably thinking as a quantitative analyst. At some point--perhaps where the N reaches about 15--the ability of most people to hold the cross-case holistic story vanishes. There are two responses in analysis. The most typical one perhaps is to essentially throw away all but the best or most familiar data informant's description. At this juncture, some formal quantification of key variables may help. When, as is increasingly the case in policy research, the number of sites is 25 or more and the number of informants may be in the hundreds, we are unquestionably in a situation where formalization of data-analysis procedures--e.g., some form of quantification, either more or less highly rigorous--is essential simply to manage the data.

CHAPTER 4

THE IMPACTS OF THE R&D UTILIZATION PROGRAM

INTRODUCTION

As our earlier discussion of this program suggests, the R&D Utilization program was ambitious in its aims. The program was not only intended to increase teachers' awareness and utilization of R&D products in local schools (product outcomes), but also to have a more global consequence. It was hoped that the program would improve the way schools identify and solve their problems, both in terms of increasing the breadth of participation in the problem-solving process, and by making the problem-solving activities themselves more rational (process outcomes).*

Early in the study of the RDU program, a series of nine relatively brief familiarization visits to schools participating in the seven operational projects was conducted. The aim of the visits was to talk with staff at these schools to become more familiar with how the program operated at the local level. Through unstructured interviews we learned that, in general, awareness and utilization of R&D products were in fact increasing through the use of improved problem-solving practices. However, it quickly became apparent that other things were happening at these schools as a direct result of their participation in the program: the schools themselves were changing in a variety of ways (organizational outcomes), as were the school personnel (personal outcomes). This led us to expand the range of school improvement impacts to be studied under our research design to include organizational development and personal growth outcomes. These outcomes were reported by school staff members to be at least as important as the intended R&D product and problem-solving process impacts.

In this chapter we present a descriptive overview of the various intended and unanticipated outcomes. The first part of the chapter focuses on a very brief overview of some of the survey responses from teachers and principals on items that were intended to tap knowledge utilization and school improvement in the schools. Here we look at four different categories of outcomes: implementation outcomes; outcomes relating to the use and incorporation of problem-solving behaviors sought by RDU; organization development outcomes for the school as a whole; and personal benefits derived by participating staff members. In the second part of the chapter, we turn our attention to a rather different question. Instead of describing how the outcomes were perceived by the individuals involved, we aggregate our outcome

*Key characteristics of the rational model are (1) thorough analysis and prioritization of school needs or problems before searching for school improvement strategies; (2) a search outside the local school system for assistance and information, particularly in the search for solutions to problems; (3) systematic examination of alternative solutions according to explicit criteria; and (4) a focus on solutions which have been field tested and empirically validated.

data to the school level, and develop a model for explaining how the various school-level outcomes are related to one another. Finally, in order to more firmly ground our description of the ways in which RDU affected participating schools, we present a simple typological classification of school outcomes, and present some vignettes about actual schools.

PROGRAM IMPACTS

For some time, a policy debate has raged over the value of educational R&D products. While proponents point to the importance of developing a "knowledge base" of programs proven to be effective, relevant to and linked with clear and enduring pupil impacts, detractors complain loudly of "old wine in new bottles," irrelevance and low levels of utilization. In addition, numerous studies have shown how quickly educational innovations are discontinued once funding evaporates or key school staff move on to other assignments (Berman and McLaughlin, 1978). Our research, however, clearly indicates high levels of teacher satisfaction with adopted R&D products, and as we see in the following chapter, the characteristics of the products themselves are strongly related to a number of program outcomes.

There has also been some question about the appropriateness of attempting to do organizational development (OD) within schools and school districts (Derr, 1976). Yet, our data indicate that in general the RDU program was successful in achieving broad-based participation in improved problem-solving practices. However, subsequent reuse of this approach is uncommon, and prospects for more enduring impacts on schools are not always bright.

Unanticipated program consequences included noteworthy impacts on the schools as organizations, ranging from reported improvements in curricula, materials and teaching methods, to pupil impacts and improvement in the schools' images in their communities. Similarly, individual teachers often reported growth in leadership skills, promotions and increased resources for colleagues. Of particular interest was a conspicuous scarcity of reports of negative consequences from participation in this program.

We now consider each of these several categories of program outcomes in greater detail. The data were drawn from surveys of principals and teachers in participating schools, as well as from site visits conducted in 90 schools (51 by the AAI research staff and 42 by case study writers engaged by the seven operational projects), and an examination of other documentation. In the discussion which follows, we focus primarily on the individual teacher and principal survey data. In the case of the teacher survey, this means that we present an overview of the data before scaling, and before aggregation to the school as the unit of analysis. The initial presentation and analyses of scaled and aggregated data occur later in this chapter in our discussions of "A Model for Examining Impacts of the R&D Utilization Program" and "The Range of Site-Level Impacts of the RDU Program."

Outcomes for R&D Products

A major objective of the R&D Utilization program was to install an appropriate R&D product in schools participating in the program. Thus, the degree to which schools identified, adopted and implemented a product relevant to the problem they sought to alleviate is a critical measure of the intermediate or proximal success of the program. Other intermediate product outcomes include various aspects of teacher satisfaction with the products, the numbers of pupils and the percentage of their school days affected by implementation, and how difficult the product was to implement, including the need for adaptation.

Approximately 100 different products or sets of curricular materials were adopted by the participating schools. The most frequently adopted products were reading packages such as the Wisconsin Design for Reading, Exemplary Center for Reading Instruction (ECRI), Houghton-Mifflin Basal Management System, and San Diego Right-to-Read. Career education packages which were most popular included Career Development Centered Curriculum, It Works, and AEL Career Decision Making Program. Popular mathematics programs included Brevard County LAMP and STAMM. In general, these programs ranged from lists of objectives for teachers to detailed management programs; some included a variety of materials for classroom use, such as slides or filmstrips and tape cassettes, student work and record-keeping sheets, and associated texts.

The characteristics of the products themselves varied along a number of dimensions, including whether they were R&D- or practitioner-based. For example, some products were intended for use in only one classroom, while others were to be implemented throughout the schools. Some, such as San Diego Right-to-Read, consisted of sets of ideas from which adopting teachers were able to pick and choose, while others, such as ECRI, required significant, highly structured changes from all teachers and were therefore more difficult to implement.

Of particular interest here is the fact that the products and materials adopted were more frequently practitioner-developed--i.e., NDN products--than the more formally developed R&D-based materials such as those in the NIE catalog. This may be due to a conspicuous dearth of R&D products in some areas such as career education, where interest only burgeoned in the early 1970s and the time available for producing a variety of relevant, validated products in time for the RDU program (which began in 1976) was too short.

Other areas in which validated R&D products were scarce include school- or district-wide planning, inservice training and basic skills at the secondary level. In the latter case, the need for products--especially reading at the secondary level--was not recognized until after the RDU program was under way. Finally, some schools needed assistance with topics stemming from racial and ethnic integration and the special needs of minority groups. The available pool of products for bilingual students was relatively sparse.

Practitioner-developed products also had a logistical advantage because they frequently had experienced trainers who were funded through other federal programs such as NDN and who could provide pre-implementation assistance and follow-up services to adopting schools. As we will see in later analyses, availability of training in product use was strongly related to several measures of program success.

Among the schools that had reached the "product selection" stage by the time of our final data collection, over 80% of the teachers responding to our survey indicated that they were using the product or had used it in the past. Another 5% had definite plans to begin use in the future. Fewer than 20% of the users reported that the products needed adaptation to a great or very great extent. Product use was at a high level: over 65% of those using the products reported they used them with all of their students, and 85% of the users stated the product was regularly used at least once per week. Satisfaction with the adopted products was generally high, with over half of the users reporting that the products were directly relevant to the most pressing problem in their school, that they filled a need in the classroom and provided new ideas. Another 25-30% of the users reported these statements were at least true "to some extent."

The users did not encounter serious problems with implementing the products they adopted. About 20% reported the products required changes in teaching style, changes in classroom organization or management, or substantial additional record keeping. Only about 9% reported difficulties in implementing the program or materials to a great or very great extent.

A more long-term, or distal, product outcome is the extent to which it is incorporated into the everyday functioning of the classroom--i.e., the extent to which product utilization is "routinized" (Yin, 1979).* At this point data from two sources become relevant. In order for the product to be incorporated not only must the teachers indicate that they plan to continue using the program or materials in the future--perhaps with modifications--but building administrators must indicate that certain steps necessary to ensure the continued possibility of use have been taken. Thus, although 83% of the users reported they would continue to use the products, it is still necessary to consider such long-term questions as whether the product has been incorporated into curriculum plans, what measures have been taken to ensure that new staff use the product, etc.

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*We choose the term incorporation very deliberately, to reflect our conviction that curriculum innovations are rarely (if ever) fully institutionalized in schools. While structural changes (such as kindergartens or a middle school) become fully institutionalized for long periods of time, a school's curriculum tends to be evolutionary, both within the school as a whole, and as it is applied in classrooms. Thus, while we find that a high percentage of teachers and principals are committed to continued use of the R&D products they selected, we suspect that if the schools were visited five years from now many of the current components of the curriculum would have been replaced with new models. The belief that institutionalization of curricular innovations is rare does not imply a value bias on our part either in favor of constant evolution or stability in curriculum.

Building principals of schools that adopted products were asked whether a variety of such events had already occurred or would definitely occur in the future. In over 70% of the schools, the products had been or would be incorporated into curriculum plans. About 50% reported that written guidelines for product use had already been developed, and another 11% reported this would definitely occur. Almost 60% reported that new staff would receive training or orientation in the use of the products, and that training or inservice for current staff would be used to ensure continued product utilization. Over 90% reported that some or all of their teachers would use the products to some extent, with 62% indicating that the products would be used quite extensively.

Outcomes for the Problem-Solving Process

In addition to the emphasis on having an R&D product installed at a participating site, a major focus of the R&D Utilization program was to increase a school's capacity to deal with its problems by providing staff with training and practice in group problem-solving processes. Though not explicit in any RDU project, it is implicit that there are two critical aspects to this goal of improving problem solving at the site level: one involves the use of a rational problem-solving model, and the other stresses the need for relatively broad-based participation in problem-solving activities. In other words, any and all groups which will be affected by the decisions reached should be present on the problem-solving team. Thus, the extent to which the sites actually used a rational problem-solving model, and the extent to which there was broad participation in problem-solving activities, become two important intermediate outcomes of participation in the RDU program. (Note that both could vary for each site across stages of the local process.)

As the program operated at the site level, these two goals were generally met while the site went through the problem-solving process. In most cases, a field agent was available to guide the site's activities, and in some cases economic sanctions could be applied should the site not "toe the mark." But factors inherent in the process itself militate against its reuse at a later time--for example some staff resented the complexity and time-consuming nature of the process. Our conversations with site staff also revealed that even when they felt they could go through the process again without the aid of a field agent, the release time provided by the RDU program was often a sine qua non of its success--otherwise teachers could not spend the often substantial amounts of time the problem-solving model required. We must also remember that, in general, improving their problem-solving practices was not the main reason sites got involved in this program. This implies that a more distal process outcome was the extent to which the improved problem-solving practices--or at least some of them--were likely to be used again in dealing with other problems.

In terms of breadth of participation in the problem-solving process, our data suggest that there was generally good representation of groups who would ultimately be affected by the decisions made. This was true across all

stages of the process, although shortcomings other than broad representation were evident. In the case of 90 sites for which we had highly detailed data, we rated them on their problem-solving and group decision-making activities in terms of a listing we developed of desired traits specific to each phase of the process.* Where a site's rating was reduced, we indicated specific types of deviations from these traits. These fell into interesting patterns across the various stages.

At 92% of the sites, problem-solving teams were established, and there was generally good representation on these teams of the groups which would be affected by the teams' decisions. In addition, both interest and attendance were high in most sites, and few members dropped out. However, during the early stages of problem solving (problem identification and solution selection), we found that decisions were often made or heavily influenced by administrators or other external parties. This was true during problem identification at 36% of the sites, and during solution selection at 24% of the sites. During the later stages of problem solving (planning for implementation and implementation), the continuity of formal decision-making groups was not upheld. This was true at almost 20% of the sites. Meetings became less regular at 26% of the sites, and decision-making at 21% of the sites did not involve all affected groups during planning for implementation.

In terms of the rationality of the process, we found that many sites appear to have adhered closely to principles of sound problem solving in many ways. In the problem-identification stage, for example, 80% of the sites appear to have carried out problem-identification procedures as planned, and arrived at a problem definition that appeared acceptable to almost all of those that would be affected by it. During solution selection, 80% or more of the sites appeared to have selected a new and relevant solution that was acceptable both to potential implementers and administrators, and this selection occurred with a level of effort that seemed to us to be appropriate for the complexity of the task. Implementation, on the other hand, was rational among the 80% or more of the sites that did not appear to have made inappropriate adaptations, that obtained reasonable administrative support, that implemented at the approximate scope that was planned, and that relied appropriately upon external technical assistance and training opportunities.

However, well over 40% of the sites showed at least one, and sometimes several, departures from our ideal criteria. During problem-identification activities, the most frequent variant was that the problem definition was merely a restatement of someone's a priori assumptions or pet theory (46% of the cases). Alternative definitions frequently were not posed and considered (43% of the cases), and the problem was not adequately specified prior to beginning the search for solutions (34% of the cases).

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*A detailed discussion of the criteria that were used to document rationality of the process is included in Appendix F. Sample criteria are: the problem definition is clear, manageable and relevant to the situation; alternative solutions are posed and carefully examined; the solution is relevant to the defined problem; any adaptations of products are appropriate and carefully thought through, etc.

During solution selection, the most common deviations were that alternative solutions were not carefully examined according to a set of explicit criteria (44%), and evidence of a solution's effectiveness or suitability was not obtained (32%). During planning for implementation, 44% of the sites did not make formal plans for some or most aspects of implementation.

During the implementation stage, adherence to sound practice was generally much closer, with only about a quarter of the sites showing any deviations. Most common among these were not taking adequate measures to ensure implementation of essential features and goals of the products (23%), and adaptations of the products implemented* when this may not have been necessary (23%).

The more distal process outcome measure is the extent to which the sites repeat some or all of the problem-solving process to solve other school problems in the future. Our data showed that 41% of the principals and about 34% of the teachers at participating schools said they had repeated (or were repeating) all or part of the RDU approach to solve another problem in their school. These parts of the approach included use of teams of teachers and administrators to make decisions, enlisting the services of an external field agent, using procedures for deciding among alternative solutions, etc.

Outcomes for Participating Schools as Organizations

We have seen that the R&D Utilization program's objective of getting R&D products installed at participating sites was, in large measure, achieved. To a somewhat lesser extent, the program's goal of improving local problem solving was also achieved, at least for this one time. However, neither of these categories of outcomes necessarily means that there will be any enduring changes in the schools as organizations. That is, the simple fact that a certain set of activities was accomplished, culminating in the adoption and implementation of, for instance, a new reading program, does not mean that the school's curriculum was improved, or that the new materials were in any way better than those used previously. Similarly, the organizational structure of the school, which is difficult to change under any circumstances, can survive other changes without alteration.

However, as we quickly learned during our preliminary site visits, a number of unanticipated effects were occurring in the schools themselves and among their staff members. The spontaneous reports of such effects by teachers and principals in unstructured interviews led us to develop specific lines of enquiry into these organizational effects. When we asked teachers to serve as internal observers of what was taking place in their schools (a methodology previously used with great success in Abt Associates' evaluation of the Rural Schools Program), 50-70% of them gave evidence of a variety of positive effects on their schools: improved curriculum; better

*Later analyses showed that local adaptation of the products was negatively related to program outcome measures. See Chapter 5.

materials available; greater collegiality among staff; and generally better teaching. About 40% of the teachers reported an improvement in school organization and management, improved decision-making and problem-solving procedures, and improved morale. About 45% of the teachers said the image of their school in the community had been improved.

It is true that 30-50% of the teachers reported "no change" on any one of these dimensions, but only a tiny minority, generally fewer than 2% of the respondents, said these dimensions had been even slightly affected adversely. Comparable data from principals of participating schools and from our research teams' visits to the schools confirmed these reports.*

Outcomes for Participating Staff

As a result of their participation in the RDU program, the staff of the schools involved had a variety of experiences: some received training in group problem-solving techniques; others had the opportunity to visit other schools or educational product developers to observe R&D products in use. Some staff received training in the use of an adopted product and returned to their schools to train their colleagues; still others became spokespersons who visited other schools to tell of their own experiences using an R&D product.

An anonymous questionnaire was used to ask participating teachers about the extent to which they personally benefited from involvement in the RDU program in a variety of ways. In general, 15-30% of the teachers reported they had benefited in the following ways to a great extent or very great extent: their teaching and leadership skills had improved; they had learned about curriculum development; they had more self-confidence and new resources for helping their colleagues. Another 30-40% reported these benefits "to some extent." Increased self-confidence and job satisfaction were also reported by many teachers, and nearly 30% reported they had been given increased responsibility or had been promoted.

A MODEL FOR EXAMINING IMPACTS OF THE R&D UTILIZATION PROGRAM

As we saw in the preceding overview of selected program impacts, the available outcome data are extensive--too extensive, in fact, to permit us to simultaneously analyze all of our variables. To reduce the number of outcomes to a more manageable set for analysis, we developed a number of summary scales through a variety of techniques briefly discussed earlier (Chapter 3) and discussed in greater detail in Appendix C to this report. Note, therefore, that the discussion in this section represents very important shifts in the unit of analysis and in the form of the data being considered. The discussion in the previous section was heavily descriptive and largely based on raw data from individual teachers and principals as the units of analysis, even when those respondents were serving as "observers"

*The correlation between principal reports and our field teams' reports of organizational impacts was .44 ($p<.01$), and between our field team and teachers .55.

of events and conditions at their schools. In contrast, in the present discussion of RDU impacts the school as an organization is the unit of analysis. To accomplish this shift, summary scales were developed from batteries of items in the surveys of teachers and principals and in the consolidated coding form (CCF). Scales developed from individual teachers survey data were then aggregated to generate school-level outcomes measures, (described in Appendix C). In this section, we identify these outcome measures and present data showing how they are related to each other.

The outcome measures that were developed include the following:

Process Outcomes

- Site satisfaction with the problem-solving process, based on reported satisfaction with the services or activities of the local action team, the RDU field agent, the developers of adopted materials, and the amount of time required to complete the process.

- Site satisfaction with the activities of the field agent, including the agent's assistance with various aspects of problem solving such as diagnosing the problem, developing criteria for selecting a solution, screening potential solutions, locating additional technical resources, etc.

- Incorporation of the problem-solving process, such as reuse of all or part of the activities and procedures which the process involves.

Product Outcomes

- Extent to which principal and teachers report the problem has been solved through use of the adopted materials, including improvements in pupil performance, attitudes, and behavior.

- Incorporation of the adopted product and/or materials, a measure of the extent to which use continues after implementation.

Unintended Outcomes or Spin-offs

- Impacts on school staff, a global measure of personal impacts including increased knowledge about curriculum development, increased self-confidence, improved teaching skills, etc.

- Impacts on the school as an organization, a global measure of impact on the school including improvements (as a result of participation in the RDU program) in curriculum, materials, school organization, staff morale, etc.

We expected that these measures would be interrelated in ways which would suggest a model for examining program impacts at the site level. For example, we predicted that more distal outcomes such as incorporation of the adopted materials and the problem-solving process would be a result of more proximal or intermediate outcomes such as satisfaction with the process, satisfaction with the field agent, and so forth.*

To investigate this matter, we performed a series of stepwise regressions, using each distal outcome as a dependent measure with the others as predictors. These regressions are summarized in Table 4-1, which presents standardized regression coefficients for those variables entering as predictors and increasing the R^2 (proportion of explained variance) by at least 1%, along with an indication of their order of entry. A raw correlation matrix is presented in Table 4-2.

To graphically summarize how these outcome measures seem to be tied together, we present Figure 4-1, which is a schema of their interrelationships suggested by the regression results. In this figure, note that the outcome measures to the left of the diagram are those assumed to be more immediate or proximal, while those to the right are assumed to be more distal outcomes. We will first briefly discuss the model, and then return to an examination of the implications for the distal outcomes.

The most immediate outcomes in this model are those which are assumed to occur closely on the heels of selection and implementation of the adopted R&D product. These include two process outcomes--satisfaction with the activities of the field agent, and satisfaction with the problem-solving process and one product outcome--scope of implementation of the R&D product. (Scope of implementation refers to the proportion of pupils and teachers in the school who are actually exposed to the adopted product and the proportion of their school day that is affected by its use.)

An intermediate outcome, and one which our analyses suggest is strongly related to the distal results, is another product outcome--the extent to which site staff report the problem has been solved. Not surprisingly, this outcome is strongly related to the scope of product implementation, and is a strong predictor of a third product outcome--the extent to which the adopted product is incorporated. Product incorporation, a primary aim of the RDU program, is also related to the scope of product implementation as well as to reported satisfaction with the problem-solving process.

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*Other distal outcomes include the extent to which the problem has been solved, personal impacts, and organizational impacts.

Table 4-1

STANDARDIZED STEPWISE REGRESSION COEFFICIENTS
FOR DISTAL OUTCOMES ON OTHER OUTCOMES
(N = 179 schools)

Other Outcomes	Distal Outcomes				
	Problem Solved	Incorporation of R&D Product	Personal Impacts	Organization Impacts	Process Incorporation
Satisfaction with Problem-Solving Process		.14* (3)a		.16** .(4)	.01 (3)
Satisfaction with Field Agent			.15* (3)		
Scope of Implementation	.19* (4)	.32** (2)		.22** (2)	
Problem Solved		.26** (1)	.29** (2)	.27** (1)	
Incorporation of Products	.25** (2)				.12 (3)
Personal Impacts	.22** (3)			.19** (3)	
Organization Impacts	.32** (1)		.33** (1)		.25** (1)
Process Incorporation				.16* (5)	
Multiple R^2:	.48	.35	.32	.51	.16
Adjusted R^2	.47	.33	.30	.50	.13

[a] Number in parentheses indicates order of entry in stepwise regressions.

* $p \leq .05$

** $p \leq .01$

Table 4-2

PEARSONIAN CORRELATIONS AMONG OUTCOME MEASURES

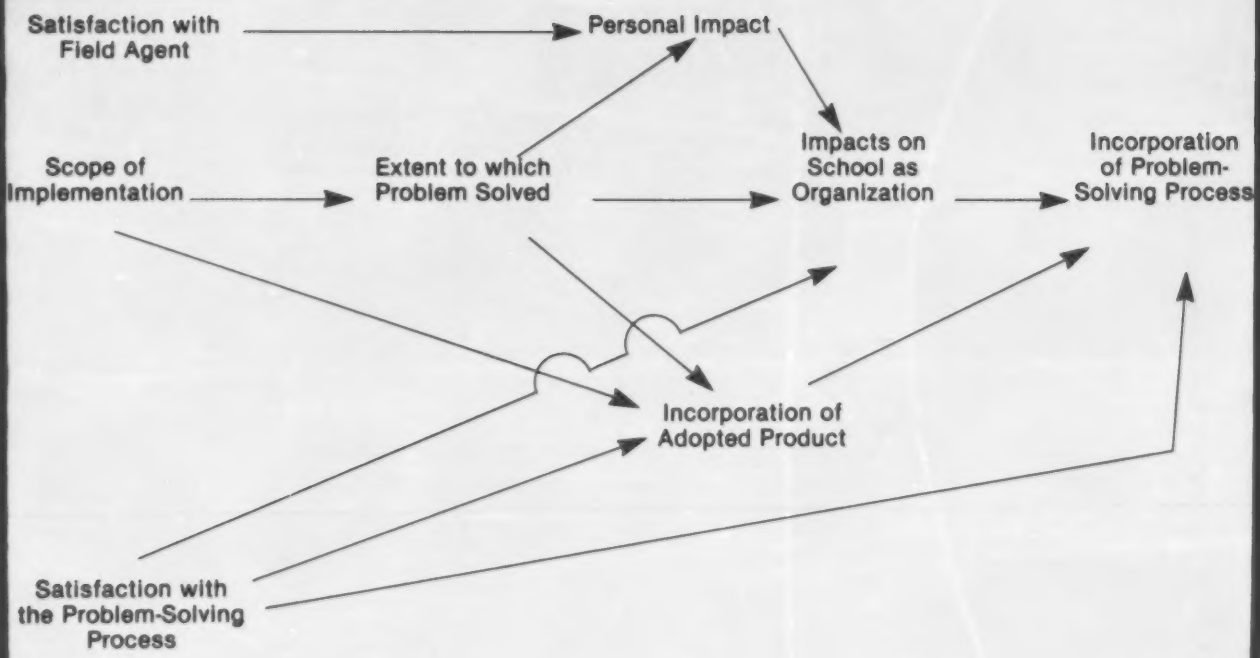
(N = 180 schools)

Outcome Measures	Satisfaction with Problem Solving	Satisfaction with Field Agent	Scope of Implementation	Problem Solved	Incorporation of R&D Product	Personal Impacts	Organization Impacts	Process Incorporation
Satisfaction with Problem-Solving Process	-	.42**	.30**	.35**	.34**	.30**	.43**	.27**
Satisfaction with Field Agent		-	.16*	.18*	.12	.27**	.26**	.11
Scope of Implementation			-	.49**	.50**	.29**	.48**	.27**
Problem Solved				-	.50**	.48**	.60**	.26**
Incorporation of R&D Products					-	.24**	.46**	.28**
Personal Impacts						-	.49**	.21**
Organization Impacts							-	.39**
								-

* $p \leq .05$

** $p \leq .01$

FIGURE 4-1
Schema of Outcome Measure Interrelationships


Satisfaction with Field Agent
Personal Impact
Scope of Implementation
Extent to which Problem Solved
Impacts on School as Organization
Incorporation of Problem-Solving Process
Incorporation of Adopted Product
Satisfaction with the Problem-Solving Process

Problem solution was also strongly related to two outcomes we have identified as "spin-offs," since they were not really the intended consequences of the RDU program. The first of these is a staff outcome measure--reported personal impacts on participants in the problem-solving process. This global measure includes reported improvements in teaching skills, knowledge, leadership skills, morale, etc., resulting from having gone through the RDU process. The extent of personal impacts was also strongly related to reported satisfaction with the activities of the field agent, with whom the staff worked during the program.

The second spin-off effect of the RDU program was also strongly related to the extent to which the problem was solved. This organizational outcome was the global measure of impact on the participating school, and includes improved curriculum and materials, decision-making structure, staff morale, the school's image in the community, etc. Since the organizational impact measure includes staff morale, it is not surprising that it is also related to personal impacts on participating staff.

A second primary aim of the RDU program, along with incorporation of the adopted R&D product, is incorporation of the improved problem-solving process into school and district decision-making activities. Specifically, the RDU program intended that the rational, participatory decision-making model it espoused would be utilized repeatedly by the sites to address other problems in the future. This outcome, which we consider the most distal program impact based on our visits to over 40 participant sites, is most strongly related to the global measure of organizational impact, and to incorporation of the adopted R&D product (the other primary aim of the program). Predictably, incorporation of the process is also related to satisfaction with the process.

However, incorporation of the process proved to be difficult at the site level, and for this reason we suggest it is the last outcome of the RDU program to be achieved. Our site visits strongly indicate that the problem with process incorporation lies in the nature of the process itself: it is complicated, time consuming to the point of frustration for many sites, and only poorly understood even by its participants. Even in sites where there were clear indications that the process (or a part of it) was being used again, members of the local decision-making team expressed confusion over what they were really doing: "Why are we repeatedly prioritizing needs?" "Why are we spending so much time on this survey of the community?" "I just can't look at another reading program; they're all alike, anyway!" Finally, even in many sites where staff reported they understood what they were doing, they were candid in admitting they could not do it again without the help of the field agent (or some other external human resource). Since incorporation of the process was a critical thrust of the RDU program, its elusiveness is a major problem to which we return in a later chapter when we investigate the efficacy of various aspects of the RDU "treatment" in producing impacts on sites.

The implications of our model for incorporation of the adopted program, on the other hand, are clearer. Here incorporation is more likely if the product solves the problem, is widely implemented, and is selected

via a process that does not alienate participating staff. More specifically, a decision-making process that ensures a close match between the characteristics of the product and the problem it addresses, followed by widespread implementation of that product, increases the likelihood of later product incorporation.

In the case of personal impacts on participating staff, it is not surprising that implementation of a product which seems to alleviate the problem enhances teachers' feelings of classroom efficacy. Similarly, interaction with a competent field agent during a complex problem-solving process is likely to increase awareness of R&D resources, bring out leadership skills, increase interaction with colleagues, and enhance morale.

In the following section, we briefly consider our model's implications for organizational impacts, since these appear to be enhanced by the effectiveness of the product in alleviating the problem, the scope of the product's implementation, and the magnitude of the personal impacts on participating staff. Our analyses suggest that organizational impacts are also strongly affected by the characteristics of the adopted product and by other aspects of the RDU intervention, as we describe in subsequent chapters.

THE RANGE OF SITE LEVEL IMPACTS OF THE RDU PROGRAM

In deciding how best to measure program impacts at the site level, two basic options were identified by project staff. One is a straightforward empirical approach which involves the development of a variety of scales from batteries of items in the surveys of principals and teachers and from the coding of case study and site visit data. A second, more typological approach was suggested by our increasing familiarity with the sites' experiences, gained through site visits and the coding of site visit and case study data. This second approach makes use of more global assessments of the kinds of outcomes we saw, and is appealing because it reduces the number of different dimensions of program success to be considered in some of our discussions.

To develop a typological outcome measure, we focused on four measures of program impact: incorporation of R&D products; incorporation of the problem-solving process; impacts on the school as an organization; and personal impacts on the staff at participating schools. (The computation of these and other measures of the RDU program's effects are discussed in Appendix B). Note that these include measures of the two primary intended impacts of the RDU program--incorporation of R&D products and incorporation of the problem-solving process--and the two areas of spin-off effects we observed--organizational and personal impacts. The following typology is intended to capture the range of global outcomes found at the sites and provides a concise summary of the RDU program's success. Sites were assigned to categories on the basis of whether they were "high" (more than one standard deviation higher than the mean score), "moderate-to-low" (within one standard deviation of the mean) or "low" (more than one standard deviation below the mean) on the four impact measures cited above. The resulting categories are defined below and illustrated with examples.*

*As noted in Chapter 3, the validity of this classification was assessed by whether sites that we were personally familiar with had been allocated to categories that seemed appropriate based on our site visit materials.

- Large-scale RDU success characterizes sites which were given high ratings on all four outcomes (product incorporation, process incorporation, personal impacts, and organizational impacts) or on any three of the four outcomes, thus including at least one program goal and at least one spin-off effect (34% of the sample).

An example of large-scale RDU success occurred in a traditionally all-black southern elementary school. Even before joining the RDU project, the school's relatively new principal had sought ways to address the severe educational disadvantagement of the school's predominantly low-income pupils. In 1976, 88% of the entering kindergarten pupils scored at the 20th percentile or below on a district-wide inventory of readiness for learning. After five or six years of schooling, the children were still far below grade level in the basic skills.

The RDU problem-solving process resulted in the adoption of the Wisconsin R&D Center's Individually Guided Education (IGE) program. Fully implemented, IGE requires comprehensive change on the part of the adopting school. It affects all aspects of school operations, including school organization and decision making, instructional programming, curriculum and materials, teaching approaches, pupil assessment, home-school-community relations, relations with school administrative agencies and teacher education institutions, and school-based research and development. The school's principal favored IGE over more narrowly focused programs because, as she said, "IGE is a process, a total framework. The band-aid treatment will be okay after the total treatment has begun."

When we revisited two years later, the school had changed in significant ways, although its problems were not yet solved. The school had been completely reorganized into teaching units spanning several grade levels. The schedule had been arranged so that the teachers in each unit had time together to plan the instructional program on a week-to-week basis to meet the current needs of the children in the unit. A great emphasis was placed on setting individual goals for the children and helping them to meet those goals through frequent regrouping to attend to specific skills. An instructional improvement committee made up of the unit leaders played a large role in school management and also in continued problem-solving activities. Relations had also been maintained with the teacher education center and with university professors who had been linked with the school through the RDU program. Morale for many teachers was greatly improved. They felt more effective in dealing with pupils, believed they had a stronger voice in decision making, and felt more unity, cooperation, and concern for one another. Although there was as yet no proof that IGE had improved pupil performance in the basic skills, the teachers felt that, in the long run, such improvements were bound to be apparent.

- Mixed-high success sites are those which had two high ratings, one a program goal (either product or process incorporation) and the other a spin-off effect (17% of the sample).

Mixed-high success is illustrated by an elementary school in the Northwest which participated in the National Education Association's In-service Education Project. The original implementation plan was simple--a film series called "The Heart of Teaching" would be used as the basis for a two-day weekend inservice workshop on the identified problem of teacher stress. To everyone's surprise, however, as they began the workshop with a discussion of current concerns, they discovered that teacher stress was no longer the most important issue facing teachers. Apparently, that problem had been resolved through the extensive discussions which took place during the process of identifying the problem and selecting and previewing the film series. What most concerned them now was a lack of consistency in expectations concerning student behavior. Instead of going ahead and viewing the film series, they spent the remainder of the workshop in a highly productive discussion of the student behavior problem and the ways in which staff behavior could be used to influence students.

This unanticipated turn of events set the precedent for intensive weekend retreats devoted to brainstorming and group problem solving. These retreats were attended by the whole faculty, as well as by the principal, and gave them a more formal vehicle for influencing school governance and planning. The teachers were pleased to be in control of their own inservice. Moreover, since the retreats were focused on problem solving in the school, the teachers felt that they had an influence over whatever concerns emerged among the staff. Although the acceptance of R&D products had possibly declined, the ability to identify and solve problems as a staff had improved substantially. In addition, there had been major changes in teacher morale. "The most important thing," said the principal, "is the sharing and trust that emerge from the retreats."

- RDU success characterizes those schools which had one or two high scores on program goals but none on spin-off effects (33 sites, or 16% of the sample).

An example of RDU success occurred in an elementary school in the Northwest, which adopted the Wisconsin Design for Reading, the Junior Great Books Program, and an enrichment program for kindergarten pupils. Although the Wisconsin Design had been suggested at the district level as the solution to a district-wide reading management problem, these decisions were confirmed by the school's own task force.

Two years later, it was reported that nearly 80% of the teachers were using the Wisconsin Design skills tests to determine and record student mastery of the various skills. Not as many were using the tests for diagnostic purposes, and only about 40% were using the supplementary materials to any great extent. However, the system had become so thoroughly incorporated into the routine teaching process that several individuals had a hard time understanding why anyone would be asking questions about it anymore. While teachers felt that the system had not made a tremendous impact on the way they teach, they felt it had achieved an important purpose, which is continuity and coordination across grade levels and schools, better record keeping, and better identification of student needs. Staff were also quite enthusiastic about the Junior Great Books and kindergarten enrichment programs.

In terms of the problem-solving process, there was very little permanent change, at least at the school level. The school had a new principal who was not inclined to participatory problem solving. However, at the district level, there appeared to be a strong commitment to increasing staff involvement in decision making. At the time of our last visit, there were three district-wide problem-solving committees, each reviewing a different problem area. In general, however, teachers did not report high levels of personal benefits or changes in the organization.

- Spin-offs are those sites which had high levels of organizational and/or personal impacts but which did not adhere closely to the problem-solving or product adoption goals of the program. In many cases schools in this category had their own agenda to begin with--e.g., developing curriculum guidelines--and used the resources of the RDU program to achieve them (10% of the sample).

An example of a site which achieved spin-off success is a district in the rural south which identified severe scope and sequence problems in reading, writing, and mathematics through a very complex needs assessment. Following that, however, they selected for implementation the Crisp County (Georgia) Career Education Package (an adaptation of "It Works"). This product obviously was not going to meet all of their needs, and its adoption was in fact insignificant compared to the main thrust of the site's problem-solving activities--that is, the local development of comprehensive curriculum guides in language arts and mathematics. The career education materials were simply infused into the language-arts curriculum and, indeed, were viewed as more or less optional activities. However, the development of the curriculum guides was viewed as a milestone in the school district, which had never before given serious attention to the coordination of its curriculum.

- Moderate-to-low success characterizes those schools which had moderate to low ratings on three or four outcome areas, and no high ratings at all (10% of the sample).

An elementary school in the South provides an example of moderate-to-low success. Lack of support from school administrators, scheduling constraints which inhibited broad faculty involvement, attrition among team members, and discontinuity in assistance from external change agents all helped to hamstring the RDU project in this school. The team's first definition of a problem was rejected by the district administration as a problem which could be handled locally without outside assistance. Following a redefinition of the problem, the team selected an innovation which was then rejected by the project staff as being an unproven product. The team was finally resigned to selecting two products from the project's "knowledge base" which they had previously decided did not meet their needs. Following a one-and-a-half day training session on the two products, the teachers made a sincere effort to apply what they had learned. However, the brief training they had received left them somewhat uncertain in their use of the new

programs. As the year wore on, the teachers tended to ignore the supplemental programs as they concerned themselves with getting through their regular textbooks. Turnover at the end of the year was high, as it was in almost every year. By now, there was just one surviving member of the original facilitator team. The principal was a passive administrator who gave no particular support to either the problem-solving process or the adopted programs. Given the low administrative support, the lack of resources for additional teacher training, the probability of continuing high turnover, and the departure of a majority of team members, it seemed obvious that the long-term impact of the RDU project would be nothing more than having added some additional materials to the classroom shelves.

- Failure, at least in project terms, characterizes those schools which were very poor achievers on two or more outcome dimensions, and which had no high ratings (13% of the sample).

An example of failure is provided by an urban junior high school in the north central part of the country. The teachers were skeptical of externally developed products, impatient with the problem-solving process, convinced that their own programs were better than most, and preoccupied with discipline problems and with a pending court decision on desegregation. When they finally selected a product for implementation in the school's reading center, it was largely because it closely resembled what they already had. In any case, the decision was moot, since barely a week later it was announced that the school would be closed the following year, would be reopened for eighth graders only, or would be converted to a K-8 fundamental school. For the next several months, as the school's fate was being decided, it was impossible to concentrate on planning a program which probably would never be implemented. And, in fact, at the end of the school year it was announced that the school would be converted to a K-8 fundamental program, while a majority of the school's teachers and students would be transferred to other schools. This effectively put an end to the project, which in any case appeared to be going nowhere.

The validity of our typological outcome categories is supported by consistency with other outcome measures and with what was known from the study of the seven operational projects. For example, examining how other outcome measures were distributed among these categories, we found that sites classified as large-scale RDU successes also showed the highest averages on measures of the scope of R&D product implementation, reported that the problem they were addressing through their RDU participation was solved to the greatest extent, and reported the highest levels of impacts on pupils. These sites also showed the highest mean level of satisfaction with the problem-solving process, and were the most satisfied with the activities of the field agent. In addition, they had the highest percentages of staff reporting that RDU was quite different from previous problem-solving practices.

SUMMARY AND CONCLUSIONS

This chapter addresses the question of what happened in the RDU program. We have seen that RDU appears to have had a variety of positive impacts, not only in its intended areas related to the use and incorporation of new curricular products and materials and an improved problem-solving process, but also in two areas we identified as spin-offs. These spin-off impacts included positive effects on participating staff and on their schools as well. We have also seen that the various outcomes we identified may be interrelated in ways which provide a model for examining program impacts.

What we have not yet discussed is why these findings occurred. In particular, we have not presented any evidence that the various elements of the RDU "treatment"--the products, the problem-solving process, and the use of external human resources--are directly related to the magnitude of these effects. Our discussion of the "whys" is presented in the remaining chapters.

CHAPTER 5

THE ROLE AND IMPACT OF EDUCATIONAL "PRODUCTS" IN THE RDU PROGRAM

INTRODUCTION

The intent of the RDU program, as it was expressed in the RFP (NIE, 1975) and other early documents, was to help schools solve educational problems through the use of existing research and development-based "products" (curriculum innovations). The original RFP indicated that proposed projects should limit their knowledge bases to products related to either basic skills or career education. In addition, the RFP indicated that contractors should emphasize quality control over the products. The "knowledge base" or product pool for each of the seven projects was to be developed separately, and was to emphasize proven effectiveness and evidence of transportability from one site to another. Thus, throughout the early portions of the RDU program a great deal of attention within each project was given to developing a knowledge base that contained acceptable products and designing a process for delivering these products to the schools. In addition, the RFP implied that the projects should attend to some process of matching each site's needs with available products. While the program designers were cognizant of ongoing research which argued that adoption was insufficient to guarantee school impact, they reflected the conviction that, if the innovation adopted did not meet certain criteria, implementation would be pointless. In the remainder of this chapter, we address questions regarding both the adoption process, and the impact of product characteristics upon knowledge utilization (implementation) and other school improvement outcomes.

MATCHING SITE NEEDS WITH AVAILABLE PRODUCTS*

The first stage of any site's participation in the RDU program involved a needs assessment of some type. Assuming that a site had completed a needs assessment, it was then ready to consider various products that could be adopted. This matching process was a potentially difficult one for the RDU projects and the schools they served, who were not experienced in evaluating the quality and applicability of externally developed materials. Most of the seven projects ultimately developed a general procedure whereby lists of potentially relevant products from the knowledge base were made available to the site teams for their consideration. However, there were significant variations among the projects in following this procedure.

*For a more extensive discussion of this topic, see Yin, Gwaltney, and Louis (1980).

Modes of Communication

In four cases (Florida, Georgia, Michigan, and NEA), the site teams were encouraged to make direct contact with knowledge-base staff,* indicating the topic or topics of interest that resulted from their needs assessments. The knowledge-base staff then identified an appropriate array of potentially relevant products and sent brief descriptions of these products to the sites. In the NEA project, this was done when a site would make a telephone call to the knowledge-base staff and descriptions of all the products in the relevant categories, based on a prior classification scheme, were then sent to the site. In other cases, and during the initial phases of most projects, the procedure was more interactive and involved face-to-face communications, with the site staff visiting the knowledge-base staff or vice versa. In Georgia, some initial orientation to the whole product array in the knowledge base was communicated through two "educational exchanges," or conferences at which teachers from many sites were invited to review a wide array of materials. These conferences were uniformly judged to be a highly satisfactory way of orienting site personnel and giving them an idea of the potential products before the needs assessments were completed.

In the three other cases (The NETWORK, NRC, and Pennsylvania), the site teams did not make direct contact with the knowledge-base staff, but worked instead with the projects' field agents.** In these cases, the agent ascertained the topics of interest from the site, worked with the knowledge-base staff to select potential innovations, and then explained the various possibilities to the site personnel. The field agent thus served as an intermediary in the matching process.

This major variation in communication links did not appear to create any consistent differences in the ultimate product adoption patterns, but deserves further attention because of the different roles implied for the field agent. In the first mode of communication, where sites dealt directly with the knowledge-base staff, the site personnel were regarded as the primary users of the knowledge base, and knowledge-base documents were oriented toward the terminology and needs of practitioners. The field agent played only a secondary role in the communications process, generally being informed of the site's interaction with the knowledge-base staff after it had occurred. In at least one project (NEA), field agents came to play increasingly peripheral functions as a result of this procedure, and on occasion the field agents were not even informed about the site's communication with the knowledge-base staff. In the second mode of communication, where sites worked through the field agents and only indirectly with the knowledge-base staff, the field agents were regarded as the primary users

*In Michigan, sites contacted the knowledge-base staff in the state department of education rather than in the sub-contracted agency.

**A "mixed" mode of communications could also occur on occasion (e.g., in a few sites in Georgia and NRC), in which the knowledge-base staff and field agents worked together in dealing with site personnel.

of the knowledge base. In this situation, knowledge-base documents were oriented toward the terminology and needs of the field agents, and thus the field agents had a strong role in influencing a site's final selection. Overall, the mode of communication reflected the degree of activity on the part of the field agents; where they were not heavily involved, the knowledge-base staff actually filled the linking function. This was the case for several of the projects.

Size of the Candidate Array

Each project also had to develop its own sense of the appropriate size of the initial candidate array, whether presented directly to the site or through a field agent. The size, or number of products, had to be large enough so that sites could have some choice in making their final selection, but small enough to be manageable. Projects generally presented about ten products, where available, in this initial array. This problem was further compounded by the nature of the materials used to describe each product. Most sites would have preferred receiving the product itself, but would then have had difficulty in reviewing the materials for such a large array. As a result, all the projects developed their own one- or two-page descriptive summaries of each project, and this was the material that was sent to each site.*

Screening of Candidate Products

Sites' screening of candidate products generally followed two stages. During the first stage, the site would, in theory, review the candidate products for their potential relevance, and reduce the initial pool of candidates to a smaller set of two or three final candidates. During the second stage, the site would request more information about these final candidates, and the knowledge-base staff would have to be contacted again for this information. At this point, the knowledge-base staff typically loaned the actual product materials to the site, or even suggested direct contact between the site and the original developers of the products (e.g., Pennsylvania). The site teams then reviewed in detail these final candidates and selected one for adoption.

This second stage was conducted most systematically in two of the RDU projects (Georgia and Pennsylvania). Occasionally, however, the knowledge-base staff had difficulty keeping track of the product materials that had been loaned out. In the other projects, the second stage was often blurred with the first, so that the process of narrowing down the initial list of candidates occurred in a less distinctive, two-stage manner. For instance,

*The issue of the size and nature of materials in the initial array needs to be given greater attention in the future. Pennsylvania, for example, initially presented a large number of candidate products to sites. When sites were finding it difficult to select a product from such a large array, the knowledge-base staff significantly reduced the number of candidate products that they presented.

where field agents were heavily involved in the matching process, the two stages might have been collapsed into a single stage, or several iterations might even have occurred before a final adoption was made.

Whatever the process, the final selection often revealed a host of problems that had to be addressed in a site-by-site manner. First, in some cases the sites may have had a single product in mind all along, possibly preceding the needs assessment activity. This prior preference may have been well-suited to the site's own sense of its needs before entering the RDU program, or it may have reflected a bias that was not justified by the site's actual needs.

Second, in other cases the sites may have identified their own candidate products to augment the candidates selected by the knowledge-base staff. This was especially true in those projects (e.g., Michigan, Georgia, and NEA) where it took two or three years to complete the knowledge base, and where the sites had therefore advanced more quickly than the RDU projects' preparations. In these cases, the sites' candidates were frequently incorporated into the incomplete knowledge base. These cases represented important occasions when nonvalidated products could be incorporated into the system because the sites did not necessarily present any compelling evidence that their candidates had been validated for prior effectiveness.

Third, the review of candidate products often revealed a mismatch between the categories or terminology used by the knowledge bases to classify their products and the categories or terminology used by the sites. The level of specificity could be different. Thus, sites could decide in their needs assessments that they had a "motivational" problem among the students, which was not specific enough to identify accurately the potentially relevant products (e.g., Florida); further probes were needed to determine that the specific problem may have been students fighting in the hallways, and on this basis it was easier to determine whether a relevant product was available or not. Conversely, some sites came up with specific needs statements, but then could not easily cope with the generality of the product descriptions (e.g., Pennsylvania). Similarly, some sites made their needs known in terms of curriculum content even though the knowledge-base products were initially classified by teaching processes (e.g., NEA), or vice versa (e.g., Florida).

Fourth, it was entirely possible that none of the candidate products, even with accurate communications, served a site's needs. In theory, the knowledge-base staff was then supposed to conduct a further search, beyond those products that were included in the projects' formal knowledge base, for a potentially relevant product--a provision that was covered by the original RFP (NIE, 1975:15). However, insufficient attention had been given to

the fact that this wider search could take a long time--far exceeding the site's schedule for adopting a specific product--and this broader search would have to be conducted with undue haste, again leading to the possibility of using nonvalidated products. Whatever the outcome, the provision for having a further iteration at this point was judged unrealistic by some projects.

All of these problems should suggest that the screening process was not an orderly or simple one. In fact, we believe that this process bore the brunt of one of the conflicting elements in the basic design of the RDU program.* On the one hand, sites were to use existing R&D products. On the other hand, sites were to undergo a problem-solving process, whereby a needs assessment was the initial step.** Only unabashed optimism would lead to the conclusion that the available validated products were likely to match, with high frequency, the articulated needs of sites. For example, in one project that carefully documented the matching process, it was noted that the project was unable to find acceptable products in 40% of the "phase I" sites. As a partial remedy, the RFP did make one provision for dealing with the potential conflict:

> ...a legitimate project outcome could be the conclusion that in a specific local situation there is no R&D [product] that represents an acceptable solution to the defined problem. Such a conclusion, properly documented, could add to [NIE's] understanding of field requirements for further R&D. (NIE, 1975:4-5)

This provision fails, however, to indicate what the site should have done when this situation was encountered. Most, if not all, of the sites were recruited into the RDU program on the basis that some assistance would be provided in dealing with their school problems. An impasse of the sort described in the RFP, while potentially useful to NIE, would not likely have been an acceptable conclusion from the site's point of view. Not surprisingly, the seven RDU projects therefore did everything they could to find some acceptable product for every site, even when the impasse was encountered. In the above named project, for example, the response in most cases was to allow the site to adopt a product that they located through other sources, as long as it was reviewed and found acceptable by the project. At the same time, it is also true that most projects did little to document, on a systematic basis, those situations in which the impasse occurred, and thus there is only sparse information regarding further needs for new types of products. The only information of this sort derives from interviews with project directors or knowledge-base staffs, who typically reported the need for more products in secondary education in general, and in non-reading and non-math curriculum topics in particular.

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*There is evidence from related interviews that some NIE staff members were aware of this potential conflict but did not influence the design of the RDU program.

**The conflict between these elements may be found in programs other than education (e.g., see Yin, 1978; and Roessner, 1979).

Final Adoption Patterns

As a result of this matching process, the sites finally did adopt some product. For sites that had adopted a product by the Spring of 1979,* the full list of adopted products, by project, is shown in Appendix E. Sixty-four products were adopted by only a single site, whereas 36 products were adopted by more than one site; of these multiple adoptions, the most popular products were: Wisconsin Design for Reading (adopted by 11 sites); Career Development Centered Curriculum (seven sites); San Diego R2R (seven sites); Exemplary Center for Reading Instruction--ECRI (six sites); It Works (six sites); AEL Career Decision Making Program (six sites); and Houghton-Mifflin Basal Management System (five sites).

This process of attempting to meet sites' needs with a predetermined set of products inevitably resulted in some loss of emphasis on the dimension of quality control. While it is impossible to determine precisely whether each adopted product had been validated at the time it was adopted, several approaches to assessing the impact of the matching process on adoptions were used. The first involved using project records to estimate the percentage of adoptions that were outside of the defined knowledge base of each project. Overall, 21% of the adoptions did not involve products that had been identified by the site/project as exemplary. Again, using project records, we are also able to estimate on a very rough basis the number of adoptions that may have involved products that did not meet the criteria that the program initially advocated. Table 5-1 presents the information from project records regarding the validation status of the adopted products.

A notable feature of the table is the preponderance of NDN products over NIE sponsored products. While we have not examined products to determine the reasons for this, both sites and project directors commented that NDN products were often more easily available, came with better (and often free) training, and were more likely to have adopter sites nearby, which made them easier to visit during the solution-selection process. The fact that they were "practitioner developed" does not appear, according to these sources, to have been a factor in their popularity.

Summary

The discrepancy between what the projects intended and what they were able to effectively provide to sites was a result of two primary factors. First, in many areas there were simply not a sufficient number of formally validated educational products to meet the needs of local schools. Among the topics treated by the RDU projects in which few field-tested or externally validated products were found after considerable effort were the following: career education; district or school-wide planning; and inservice training for teachers. In addition, the area of secondary school curricula, particularly in the area of basic skills, produced very few tested educational products that met school needs. In order to be responsive to the service delivery mandates of their programs, the RDU projects were forced in many instances to use expert judgement on surface validity, rather than external evaluation data as the quality control basis in admitting products to their pools.

*Many sites had not reached the adoption step by that time.

Table 5-1

PRODUCT ADOPTION PATTERNS FOR EACH RDU PROJECT, BY SPRING 1979

Project	ADOPTIONS							
		Assumed To Have Been Validated			Not Known To Have Been Validated			
	Total	Number from NIE Catalog (Validated)	Number from NDN Catalog	Number Through Local Validation*	Number from NIE Catalog (Not Validated)	Number Outside of Knowledge Base**	Number Without Local Validation**	Percent Non-Validated
NRC	45	4	5	6	--	30	--	66.7
Pennsylvania	13	--	9	3	--	1	--	7.7
Georgia	24	1	5	--	1	4	13	75.0
Network	27	6	18	3	--	--	--	0.0
NEA****	?	?	?	--	?	?	?	?
Florida	22	4	1	--	--	--	17	77.3
Michigan	63	--	9	--	3	3	48	85.7
Total	194	15	47	12	4	38***	78	61.9

*Each of the projects with a local validation procedure was arbitrarily assumed to have properly used it, leading to a more conservative estimate of the overall proportion of nonvalidated products. The single exception is the NEA, where it was known that most products did not go through the local validation procedure.

**Some of these may have been validated through an alternative procedure (e.g., by the commercial publisher). The extent of this phenomenon is not known.

***Three products that were outside the knowledge base were nevertheless NIE or NDN products. These three products were, therefore, assigned to the NIE or NDN columns in this table.

Second, in the case of the 20% of the sites that chose products from outside the knowledge base (and the many more that adopted an approved product in order to satisfy the project, but also found non-approved products to supplement this choice), site preferences and the overriding norms of service delivery were the key. In most cases, these "low quality" selections were made after six months to a year of intensive involvement between the site and the project. It is small wonder that projects were inclined to continue delivering services to schools that were committed to innovation and to the project, but simply could not find an approved product to meet their needs.

Having determined that the matching process is problematic, it is also important to note that the RDU project was, on the whole, enormously successful in providing the sites with some product that had the potential for meeting the school's expressed needs. As we pointed out in Chapter 4, most schools adopted something, and of those who adopted, most expressed satisfaction and were committed to utilization. However, as noted also in Chapter 4, there was considerable variance on many of the variables that we have used to serve as indicators of the longer range impacts of the RDU program on the school. The question to which we now turn is, what is the impact of the product's characteristics upon more long-range school-level outcomes?

DOES THE SOLUTION MAKE A DIFFERENCE: A CLOSER LOOK AT THE CHARACTERISTICS OF ADOPTED PRODUCTS

While the projects found that the process of developing knowledge bases and matching local site needs to available products was difficult in many instances, the problems of managing a knowledge base were limited compared to those of managing a dispersed staff of field agents and training subcontractors, or managing the internal problem-solving process used by individual schools (Louis and Rosenblum, 1981). The fact that it is theoretically possible to control the products and materials in the knowledge bases makes an analysis of product characteristics and their impact on school improvement outcomes particularly relevant for the development of policy and management recommendations. Before describing the impact of products on local site outcomes, it is useful to review some of the major perspectives on the role of products in managed change programs, and their implications for the measures of product characteristics used in this report.

Three Perspectives on Products and Outcomes

There are a variety of traditions that reflect somewhat different views of the product characteristics that may have the most impact upon school improvement: the diffusion perspective, the adopter perspective and the adaptation perspective. In selecting measures to include in the following analysis, we have attempted to reflect each of these.

Diffusion Perspective. Perhaps the most traditional of these is the diffusion research model which has typically attempted to classify objective characteristics of the innovation, and determine their relationship to the spread of that innovation in a general population (Rogers and Shoemaker, 1971).

Among the product characteristics that are more frequently measured in this highly technological perspective are the complexity* of the innovation (the number of different parts that it has), the trialability or reversibility of the innovation (how difficult would it be to stop using it if it proves unsatisfactory), and the relative advantage compared to existing practices. In addition, other research has indicated that a key problem in the spread of educational innovations is transferability, which often translates into whether the innovation is accompanied by adequate guidance for implementation by another person (Stearns, 1973). In addition, current federal policies strongly support the notion that a key to obtaining beneficial school outcomes is disseminating only field-tested or validated products (although there is considerable evidence that practitioners use criteria of source credibility rather than research evidence to evaluate information). As noted in the previous section the latter two characteristics of products were part of the general guidelines that NIE developed to assist the seven RDU projects in developing their knowledge bases.

Adopter Perspective. A second way of approaching the importance of product characteristics is most distinctively expressed by Downs and Mohr (1976) who assert that innovation characteristics can only be understood by looking at their meaning from the perspective of the potential adopter. Thus, this approach would tend to examine not objective complexity, but a subjective measure of how difficult it is for the individual to adopt it, and how much change must occur for full implementation to take place. In addition, it may be argued that the objective characteristics are less important than the degree to which there is a match between the expressed need or problem of an adopting school or individual and the ostensible objectives of the innovative program. Finally, it may matter a great deal whether the adopting school or individual believes the product to provide genuinely new and better ways of doing things that are relevant to the problems of the school and classroom. This might be labeled subjective quality.

Adaptation Perspective. A final perspective is derived from the emphasis upon adaptation and local development espoused by Mann (1979) and Berman and McLaughlin (1977). From this perspective, one might argue that the objective and initial subjective reactions to an "innovation" are less important than whether the local staff takes an active role in reworking the materials and ideas to fit the local context. That is, the key to a "good" innovation is the existence of local materials development and formal adaptations of the externally developed product.

Data Sources and Analysis

Each of these three perspectives was tapped in measures of product characteristics used in the study of the R&D Utilization program. Most of the product characteristics--field-test/validation status, relative advantage, complexity, reversibility, provision of guidance for implementation, the amount of pre- and post-implementation adaptation, and the degree to which the product appeared to match the identified problem in the school--were measured through single questionnaire items on the consolidated coding form (CCF) completed by site visit staff members. The perception of product

*Underlined words represent measures used in the analysis.

quality was composed of an index of three items from the teacher questionnaire reflecting the novelty and applicability of the ideas to the individual teachers and school context, while the difficulty of implementation was an index composed of four highly interrelated items (amount of change required from previous teaching style, amount of change required in classroom organization or management, amount of recordkeeping required, and overall difficulty of implementation).

To assess the importance of product characteristics in explaining school-level outcome measures, we performed a series of stepwise regression analyses, simultaneously relating sets of indicators of product characteristics which reflect all three perspectives on products and outcomes to six key school-level outcomes. The outcome measures included the extent to which the problem was reported as "solved," the extent of program impact on the school as an organization, personal impacts on participating staff, incorporation of the program, and incorporation of the problem-solving process. We also examined the scope of product implementation--i.e., the extent of product use. The results of these analyses are summarized in Table 5-2, which presents standardized stepwise regression coefficients and proportions of variance in outcomes explained by the products' characteristics (R^2s). In the discussion which follows, we first examine the importance of product characteristics from the diffusion, adopter, and adaptation perspectives (the rows in Table 5-2). We then look more closely at the explanation of specific outcomes (the columns in Table 5-2).

The diffusion perspective is represented in Table 5-2 by five indicators of product characteristics, as discussed above: complexity, reversibility, relative advantage over previous practice, availability of adequate guidance for implementation, and product validation. Our analyses suggest that some of these product characteristics were strongly related to several outcome measures. Product complexity (in the sense of the number of things which must change in order to implement the product) is important in explaining the school-level outcome measures. Complexity is strongly and positively related to organizational impacts on the school, incorporation and continuing use of the product, and personal impacts on staff. Not surprisingly, the product's relative advantage over previous practices was also positively related to product incorporation, but was not significantly related to other outcome measures. Product validation was positively related only to process incorporation. Neither reversibility nor the availability of adequate guidance for implementation was significantly related to any of the outcome measures in these analyses.

Thus, the diffusion perspective appears to have some validity for explaining four of the six outcomes: organizational impacts; product incorporation; process incorporation; and personal impact on staff. Note also that product validation, an indicator of this perspective, was the only product characteristic significantly related to our most elusive outcome, incorporation of the problem-solving process. The diffusion perspective was of little utility in explaining the more proximal outcomes: the extent to which the problem was solved or the scope of product implementation.

Table 5-2

STANDARDIZED STEPWISE REGRESSION (BETA)+ COEFFICIENTS
FOR THE RELATIONSHIP BETWEEN PRODUCT CHARACTERISTICS AND SIX
MEASURES OF SCHOOL OUTCOMES
(N = 60)

Product Variables	School Outcomes					
	Organizational Impacts	Product Incorporation	Process Incorporation	Problem Solved	Scope of Implementation	Personal Impacts
Diffusion Perspective						
Product Complexity	.31**	.29**				.21*
Product Reversability						
Relative Advantage		.20*	.20			
Adequate Implem. Guidance				.17		
Product Validated			.35**		.22	
Adopter Perspective						
Difficulty of Implementation	.28**			.23*	.31**	
Match to Problem		.19		.13		
Product Quality		.24**		.58**	.19	.36**
Adaptation Perspective						
New Materials Development	-.17				-.27*	
Pre-Implementation Adapt.						-.16
Post-Implementation Adapt.				-.19		-.13
Multiple R^2	.34	.46	.17	.51	.33	.36
Adjusted Multiple R^2	.28	.40	.10	.46	.26	.30

+ Beta Coefficients are presented only for those variables which contributed to the reported multiple R^2. The selection process was stopped when additional variables failed to increase the Multiple R^2 by 1% or more; the order of entry was unforced.

* $p \leq .05$

** $p \leq .01$

The adopter perspective is represented in these analyses by three product characteristics: difficulty of implementation (e.g., changes in classroom organization, record-keeping, and other procedures necessitated by implementation); the degree to which the adopted product matches or fits the problem it was selected to solve; and the teachers' assessment of product quality (i.e., the extent to which it provides new information, meets a classroom need, and seems relevant to pressing school problems).

Teachers' assessments of difficulty in implementing the product were positively related to three outcomes: organizational impacts, the extent to which the problem was solved, and scope of product implementation. Product quality was significantly related to product incorporation, the extent to which the problem was solved, and personal impacts on staff. Surprisingly, the product's match to the problem was not significantly related to any of the outcomes.

The adopter perspective, therefore, also appears to have some validity in explaining school outcomes. Note particularly that this perspective was more useful than the diffusion perspective in explaining the proximal outcomes, scope of implementation and extent to which the problem was solved.

The adaptation perspective is represented by three product characteristics: the need to develop additional new materials in order to implement the product; the extent to which the product was adapted prior to implementation; and the extent to which it was adapted after implementation. In the context of our findings already discussed and the work of others, our investigation of the adaptation perspective was particularly interesting.

The need for adaptation of the product, whether prior to implementation or subsequent to it, is part of the tradition of "mutual adaptation" explicated in other research (Berman and MacLaughlin, 1975). Our findings run contrary to this research, as Table 5-2 indicates. Four different indicators of the product's need for adaptation were included in our analyses: two items in the teachers' survey asked about the extent to which the products required modification, and the extent to which they required local development of materials. In addition, two items in the CCF data provided information on the extent to which the products were adapted (modified) prior to and subsequent to implementation. The teachers' assessments of the need for product modifications did not enter any of the regressions on school outcomes (and are not included on Table 5-2); the teachers' assessments of the need for local development of materials and the two CCF items on the need for modifications did enter some of the regressions with three school-level outcomes (problem solution, impacts on the school as an organization, and impacts on staff), though their individual regression coefficients were not statistically significant at the .05 level (alpha's ranged from .06 to .18). However, the results suggest that such adaptations may be negatively related to school outcomes. That is, adapting the products appears to reduce their efficacy. This may also reflect the nature of the solution selection activities, however, raising the question of whether products which really

matched the site's problem were identified and carefully screened before the final selection was made. We hypothesize that more careful selection procedures could substantially reduce the need for adaptation before and after implementation and enhance the other program outcomes (a topic that will be explored further in Chapter 9).

In addition, we find that on-site materials development is negatively related to the scope of the implementation occurring in schools. In other words, high levels of local intervention in the RDU program appear to accompany smaller scale, more localized activities involving fewer teachers and less time. This finding is not unreasonable--RDU was a teacher-dominated process for the most part, and in few schools can teachers commit the time needed to design large-scale change programs "from scratch." It also suggests, however, that with a limited amount of resources, they may be turned either toward broader implementation or toward on-site materials development, but probably not both.

This set of findings also raises an interesting question with regard to the now common assumption that mutual adaptation is desirable. We suggest that in the more top-down approach to change in educational organizations, adaptation of the adopted R&D product might serve the useful function of providing the teaching staff, who will be expected to implement the product, with a sense of ownership. This feeling of personal investment in the change program might otherwise be lacking, depending on just how centralized--e.g., in the offices of district or building administrators--the decisions regarding the change program really are. Given an increased sense of ownership, teaching staff may then implement and continue to use the product to a greater extent than would otherwise have been the case, and may feel more positive about its efficacy regardless of how their adaptations might have altered the product's quality.

In contrast, the R&D Utilization program, with its emphasis on a bottom-up decision-making process, aimed at maximizing teacher involvement in careful selection and ownership of the program at every step along the way. Thus, it may not have been necessary to involve teachers in the adaptation of the product when, given careful selection, it really needed no such modification. This contention is supported by our findings that local development of materials and other adaptations, both before and after implementation, were negatively related to program outcomes.

In summary, therefore, we found that both the diffusion and adopter perspectives on product characteristics and school outcomes were supported as explanations for the RDU impacts in schools. The adaptation perspective, however, was contradicted.

A review of the columns of Table 5-2 reveals the combinations of product characteristics that appear to be the most favorable for achieving each of the school outcomes. Positive organizational impacts on schools are maximized when complex products which are difficult to implement are selected. Site visit data suggest that such products may require more interaction among staff and with administrators in the implementation process--

which results in improved teaching methods. In a number of instances, more complex products were sufficiently "newsworthy" that schools were able to gain effective publicity for their new activities in local papers, improving their image in the community. More complex products also provided a more substantial basis for "spin off" activities involving additional innovation or change that was not originally part of the intended program.

Product incorporation (i.e., continued use) is more likely to be achieved when the product selected is complex, has clear advantages over previous practices, and is of high quality. Although a close match between product and the problem it was chosen to address also seems to enhance chances for incorporation, the relationship was not statistically significant in this analysis. This cluster of variables tends to suggest that incorporation has a strong element of rationality: products which are viewed as good, and are well suited to their local environment, will tend to be retained. It is important to emphasize that this interpretation does not imply that rationality dominates the incorporation decision, but only that there appears to be some match between the effectiveness and quality of the program and its retention. Again, the reasons for this may be the emphasis on rational decision making and the participation of all affected parties throughout the RDU process. In addition, site visit data indicate that the level of actual in-kind investments in RDU schools may have created a built-in incentive for incorporation that apparently did not exist in many of the programs studied by Berman & McLaughlin (1977). (See Chapter 10 for a discussion of program costs and in-kind contributions.)

Staff development or personal outcomes also seem greatest when a complex product of high subjective quality is chosen. As was suggested above, the more complex products--i.e., those requiring more changes in previous practice--may have positive effects on staff because their implementation often requires more interaction among colleagues. In addition, many staff members who were interviewed suggested that their sense of efficacy was increased when, as a faculty, they were able to implement a complicated new curriculum program. Increasing levels of interaction around the implementation of a complex new set of practices also seems to increase teachers' perceptions that they have something to offer one another. Complex products typically required more planning for implementation, thus exposing teachers more systematically to situations where they learned more about new curriculum ideas, and decision-making or problem-solving skills.

The extent to which the problem was solved is the best predicted outcome of all our outcomes measures, with 46% of the variance accounted for by five variables. The key predictors of problem resolution were product quality and difficulty of implementation, with lesser contributions made by the adequacy of implementation guidance, the degree to which the product matched the problem, and the minimization of post-implementation adaptation. This cluster of variables suggests considerable support for the interpretation of Gross et al.'s (1971) study of the problems of implementation at the

Cambire elementary school. The authors distinguish between two different kinds of "difficulty of implementation." The first derives from the amount of change that is requested of the teacher--the more he or she must move from current practices, the more difficult the implementation. A second source of difficulty emerges from the vagueness of expectations surrounding the proposed changes, and can be summarized by whether the teachers can actually understand what they are expected to do. While the first type of difficulty of implementation--amount of change required--improves the chances of problem resolution, the second type--vagueness and appropriateness of implementation requirements--militates strongly against it.

We now turn to the explanation of incorporation of the problem-solving process. As the R^2 for this column shows, process incorporation was a relatively difficult program outcome to explain: product characteristics, though they were generally powerful predictive variables, only explained 17% of the variance in measure of process incorporation. Furthermore, the product characteristics variables which entered the regression with process incorporation were a different set from those which had been useful in the analyses of other outcomes. Process incorporation was highest at those schools which adopted field-validated products that showed a clear advantage over previous practice. On the other hand, product quality and the amount of effort required for implementation seemed to be irrelevant, though these had been important predictors of other outcomes. (We will see in a later chapter that process incorporation was more strongly related to characteristics of the sites than to aspects of the RDU intervention itself.)

ARE GOOD PRODUCTS ENOUGH?

While product characteristics have a considerable impact on the scope of implementation in a school (Table 5-2), we must be careful to avoid a deterministic interpretation of this finding. We do not know, for example, why or how teachers implement these products. Is teacher use mandatory, voluntary, or discretionary? Is implementation piece-meal, with teachers picking and choosing from among various components of programs and only using them occasionally with subgroups of the pupils targeted for these materials? In some cases teachers' implementation will be pro forma, while others become intensely committed. These issues will be elaborated on in latter chapters of this volume.

We also saw in the previous chapter that the scope of product implementation is strongly related to other school outcomes. Thus, the question arises as to how implementation can be increased. That is, what factors were related to teachers' inclinations to actually use the adopted product in their classrooms? We explored this question in two separate analyses. The first analysis presented in the previous section of this chapter, used only product characteristics as predictor variables.

A second analysis of teachers' reported implementation behavior used a fuller range of indicators of the RDU treatment to identify factors related to the inclination to implement. The purpose of adding additional

variables to the regression is to test the possibility that the strong relationship between product characteristics and scope of implementation "washes out" when more powerful factors are entered. (The other variables used in this regression will be defined in greater detail in Chapters 6 and 7.) The results of this stepwise regression are summarized in Table 5-3, and again show the importance of product characteristics, even when other elements of the RDU intervention were included as potential explanatory variables. Validated products seen to be of high quality resulted in higher levels of implementation. However, scope of implementation was also significantly enhanced by contact with external resource persons: between the local action team and the field agent, and with multiple sources of training in product use. Because the external assistance appears to be of equal importance to the products in this preliminary analysis, it is to this topic that we turn in the next chapter.

Table 5-3

STANDARDIZED REGRESSION COEFFICIENTS FOR SCOPE OF IMPLEMENTATION REGRESSED ON PRODUCT CHARACTERISTICS AND OTHER VARIABLES (N=60)

Product Variables	
Product Quality	.23*
Difficulty of Implementation	
Field test/validation status	.17
Relative advantage	
Complexity	
External T.A. Variables	
Agent/Principal Contact	
Agent Innovativeness	
Agent Initiative	.20
Agent Time on Site	.27*
Agent Political Perspective	
Agent Structural Perspective	
Amount of Training	.19*
Variety of Training Sources	
Satisfaction with Agent	
Internal Process Variables	
Principal Influence	
Faculty Influence	
Breadth of Involvement in Solution Selection	
Level of Effort	
Quality of Problem Solving	
Satisfaction with Problem-Solving Process	
Multiple R^2	.49
Adjusted Multiple R^2	.43

*$p \leq .05$

CHAPTER 6

THE IMPACT OF TRAINING AND TECHNICAL ASSISTANCE

INTRODUCTION

External assistance was provided to schools in the R&D Utilization program by two types of people--generalist field agents and more specialized trainers or expert consultants. In this chapter we explore the ways in which both field agents and expert trainers related to the participating schools, how the schools assessed these services, and their direct and indirect impacts upon the school. The specific questions to be addressed include:

- What kinds of help and assistance did RDU field agents and other consultants provide to local sites?
- What styles or types of assistance were most effective, as judged by local sites?
- What is the impact of technical assistance upon school improvement outcomes? Is impact direct or indirect?

These questions must be viewed in a context of existing controversies about the importance and role of external providers of technical assistance, both in the field of education and in other settings. Since the mid-sixties, some educators and others involved in "technology transfer" have argued that the pace and quality of adaptation being demanded of today's schools require the development of a role that is similar to that of the agricultural extension agent, who has contributed so significantly to the development and modernization of rural farm communities (CASEA, 1965). At the same time, however, the distaste of educational practitioners for outside experts has been well documented by almost every observer of planned change activities in schools (Schmuck, 1968). Some observers of schools have even suggested that the culture and structure of schools may prevent them from making effective use of any systematic external assistance, such as that provided through an organization development program (Derr, 1976).

More recently, policy researchers studying federal demonstrations or programs supporting local intervention have suggested that the ineffectiveness of "outside experts" occurs not simply because "experts" and "practitioners" view the world in different ways, but because experts tend to want to impose their own ideas upon a school or district, and are therefore incapable of gaining the necessary commitment from staff to get them to view a new program as their own (Rosenblum and Louis, 1981; Greenwood et al., 1975). At the same time, however, there is growing evidence to suggest that local school people often do need help in carrying out a planned change program. For example, the most careful packaging and instructions for implementation which accompanied the PIPS (Project Information Package) demonstration program did not eliminate the need for some personal assistance in helping to design a local implementation effort (Stearns et al., 1977). Similarly, the study of an early effort to develop new field agent roles

in education revealed that generalist agents had significant impacts in stimulating interest in knowledge utilization, and at least some effects on actual use even with very small investments of time spent with a client (Sieber et al., 1972). In addition, a recent study of organization development activities in local schools indicates that, while the presence of an active internal trainer and "change agent" is critical, the role of external expertise is very important (Miles et al., 1981).

Overall, we know very little currently about why educational agents have an effect--either negative or positive. There are many volumes that advocate certain strategies for producing change (for example, Zaltman and Duncan, 1977; Zaltman et al., 1978), but the empirical evidence has grown only modestly since Rogers and Shoemaker's (1972) and Havelock's (1969) massive reviews of the literature. Thus, our approach in this analysis is a highly exploratory one.

TYPES OF EXTERNAL ASSISTANCE IN THE RDU PROGRAM

While the RFP for the RDU program did not require a field agent role, each of the seven winning proposals included such a role. The role, partly by coincidence, but mostly as a consequence of the program's focus on knowledge utilization and school improvement, had several common features across projects.

First, in all the projects, field agents from outside the school system (known variously as "linking agents," "generalists," "coordinators," and "facilitators") were expected to provide in-person services to schools at the school site. The RDU program supported 100 field agents during the course of the program.

Second, in all cases, the field agents were physically located outside an RDU project office, in a "host organization" that was geographically closer to their client schools. The "host organizations" were predominately state-related intermediate service agencies. There were, however, some other agencies that housed agents. For example, the NEA project housed its "facilitators" in State Departments and state education associations in each state that it served. The NETWORK/Consortium project used a variety of agencies, including a teacher center, a regional lab, and an LEA.

Third, in all cases the field agents were viewed as coordinators of the process assistance that schools would need if they were to choose to implement improved curriculum and staff development practices. Process assistance typically involved, at minimum, orienting school personnel to a rational problem-solving model that sites were expected to use. In some cases, however, the field agents were expected either to participate in training school staff, or to provide the staff with substantial process consultations as they implemented a problem-solving model.

Fourth, agents were not expected to take responsibility for finding exemplary programs for the client schools to implement. This function was typically performed by specialists located elsewhere in the project structure. However, they were expected to provide schools with assistance in making choices from among alternative new practices, and to help them locate human resources that could assist the schools with implementation.

Finally, field agents in the RDU program were all trained as educators, and almost all had had some relatively recent experience working with school districts, either as independent consultants or as staff of a state education association. They were, on the whole, much closer to the world of practice than to the world of research and development.

Who Were the RDU Field Agents, and What Did They Do?

People became involved as field agents in the RDU program in a variety of ways. Some assumed the position by nature of their present jobs--simply adding one more set of responsibilities to an already full complement of activities. Others were hired from the ranks of teachers and administrators to become full-time field agents--essentially leaving their old responsibilities behind. And for a few who were unemployed at the time, the position was the first suitable job to become available. For some, the field agent position offered the potential for individual challenge and professional development, while for others the extra work involved reduced their enthusiasm.

The field agents were highly educated: of the 53 respondents to the first field agent survey,* all but one had an advanced degree beyond the baccalaureate; 70% had achieved a master's degree, and 30% held a Ph.D. or Ed.D. The field agent job came at varying times in their careers. For some, this was their first "real" job after obtaining their most recent degree; for others this would be the last "formal" job prior to retirement. While these extremes did exist, the average age at the time of the first survey was 41--very much a mid-career stage in life. The age of the field agents varied widely by project, from an average of 34 years in the Pennsylvania and NETWORK projects to an average of 47 years in the NEA project. Of the respondents who answered all three surveys, there were more male (24) than female (19) field agents.

Since the seven projects all began at the same time--though some were slower in hiring than others--there were no marked differences by project in the number of months of experience as an RDU field agent. At the same time of the first survey, 16 months was the average length of time in the field agent position. It should be noted, however, that a number of the respondents came to this position from backgrounds that were quite relevant--

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*The data sources described in detail in Chapter 3 are supplemented in this chapter with data obtained directly from field agents. The most important agent data source was a three-wave mailed survey which was sent to a sample of 69 of the 100 field agents. The 69 agents represented the universe of agents in six of the seven RDU projects, and a sample of 18 in the Michigan project. Fifty-three field agents responded to the first survey, which was sent out in May 1978 (a return rate of 78%), with a 100% return rate from four the seven projects. The somewhat lower response rates from the Michigan and NEA projects was not unexpected, given the very small part of these respondents' jobs represented by their participation in the RDU program.

The second and third surveys, sent out in January and May of 1979, were completed only by those field agents who responded to the first survey.

for example, a few were associated with National Diffusion Network facilitator projects or were consultants based in local school districts or intermediate service agencies. Seventy-five percent of the respondents to the first survey had had experience with other federally funded programs, 65% had had experience with other "linking" roles, and 35% had had experience with R&D products or outcomes.

Field Agent Roles

There are many different perceptions of what educational field agents should do. The research and theoretical literature usually describes the field agent role in terms of the problem solving/knowledge utilization process. For example, Havelock (1973) has identified four change agent roles, labelled "catalyst," "solution giver," "process helper" and "resource linker." The field agent can serve as a catalyst by helping school district personnel to overcome their reluctance to change. He or she can then simply offer a solution, or guide local staff through the stages of a logical problem-solving process. The agent's access to human, financial or other resources is also of great importance. Butler and Paisley (1978) also describe the roles of "process helper," "solution giver" and "resource finder," and Madey (1979) has most recently suggested three role categories: "facilitator," "resource finder," and "communicator."

In our research we attempted to discover the extent to which the field agents in the RDU program perceived themselves as fitting into a fixed list of role categories, chosen to reflect the roles described in the literature and our perceptions of actual variations in the RDU field agent role. The field agents were asked to assess the extent to which they had expected to perform certain aspects of the field agent role, and the extent to which they actually performed those roles. Responses to these questions for the 43 agents who responded to all three surveys are summarized in Table 6-1, with the potential roles listed in descending order of actual performance.*

It is clear that the field agents perceived themselves primarily as resource persons and coordinators. Some of the activities that the field agents neither perceived as important nor actually performed were active involvement in program implementation, involvement in evaluation, and providing content specialist assistance. These activities are highly specialized, and involve skills that many of the agents did not personally feel they had.

For the most part, their actual role performance was consistent with their own expectations. There are, however, two exceptions: the field agents felt that they should have been performing the role of an expert in assessing the match between innovations and problems to a greater extent than they were actually performing that role. Further, they performed the role of counselor or "hand-holder" to a greater extent than they expected.

*See Louis and Kell, 1981, for fuller description of field agent activities, including a sample weekly log and several case studies.

Table 6-1

RANKS AND MEAN RATINGS OF FIELD AGENTS' EXPECTED AND ACTUAL EXTENT OF PERFORMANCE OF VARIOUS FIELD AGENT ROLES
(N = 43)

Field Agent Roles	Field Agents' Expectations			Actual Performance		
	Rank	Mean*	S.D.	Rank	Mean*	S.D.
a. Resource Person	1	4.5	.7	1	4.2	.94
b. Coordinator	2	4.3	.9	1	4.2	1.0
c. Process Trainer	3	3.5	1.1	3	3.3	1.1
d. Observer/Historian	6	3.2	.93	3	3.3	1.1
e. Counselor or "Hand-Holder"	6	3.2	1.2	3	3.3	1.1
f. Expert in Assessing the Match between Innovations & Problems	3	3.5	.9	6	3.0	.95
g. Conflict Resolver	5	3.3	1.1	6	3.0	1.1
h. Basic skills, Career Education or Inservice Specialist	8	3.0	1.2	6	3.0	1.2
i. Program Implementor	10	2.6	1.2	9	2.6	1.3
j. Evaluator	9	2.8	1.2	10	2.5	1.1

*Response Scale:

5 = to a very great extent
4 = to a great extent
3 = to some extent
2 = to a little extent
1 = not at all

Field Agent Activities

The above discussion of role definition focuses on the more global parameters of the roles field agents play. Yet, from the perspective of a job occupant, the activities that make up the day-to-day cycle of events are in many ways more salient and more likely to stimulate positive or negative reactions than the more general role definitions. Based upon interviews with a sample of agents, a list of routine field agent activities was generated and included in a survey of agents. The RDU field agents were asked to rate the importance of each activity, and the amount of time spent on it. The results are shown in Table 6-2. On average, the field agents were spending the greatest amount of time in (1) meetings with small planning groups at the sites, (2) writing reports and filling out forms, (3) arranging, designing, or conducting workshops, and (4) travelling from site to site.

In general, there was little discrepancy between the amount of time the field agents were spending on various activities and the degree of importance they attached to these activities. There were, however, these notable exceptions: developing themselves professionally and reading materials about R&D products were both thought of as more than moderately important, ranking second and sixth, respectively, among the 16 possible activities, and yet they consumed relatively little of the field agents' time. This is consistent with the finding that the field agents felt they should be performing the role of an expert in assessing the match between innovations and problems to a greater extent than they were actually doing. The field agents appear to have taken seriously the notion of themselves as links to knowledge about R&D products or innovations, at the same time feeling somewhat inadequate in the extent to which they performed this function and, perhaps, in the extent to which they currently had the knowledge and expertise to perform it well.

There is also a discrepancy between the importance of, and the amount of time spent in, writing reports or filling out forms and travelling from site to site. That is, both these activities rank low in importance but high in the amount of time they consumed. Indeed, writing reports and filling out forms is the only activity which was rated lower in importance ($\bar{x}$ = 2.1) than in the amount of time it consumed ($\bar{x}$ = 2.5). The conflict between "paper work" and "people work" was one that arose again and again in interviews and discussions with agents, who by far preferred their field and technical assistance roles to office work.

Expert Technical Assistance and Training in the RDU Program

One of the key concepts underlying RDU was the notion of "networking," which was often interpreted as the provision of timely organizational resources to individual client schools. (For more discussion of networking in the RDU program, see Louis and Rosenblum, 1981.) Overall, the provision of technical assistance and training from persons other than the field agent was probably somewhat more limited than the original designers of the RDU program had intended. For example, the original RFP did not mention the terms "linking agent" or "field agent," but spent considerable time explicating the importance of inter-agency linkages that would be

Table 6-2

RANKS AND MEAN RATINGS OF PERCEIVED IMPORTANCE AND ACTUAL AMOUNT OF TIME SPENT ON VARIOUS FIELD AGENT ACTIVITIES (N = 43)

Field Agent Activities	Importance			Amount of Time Spent		
	Rank	Mean*	S.D.	Rank	Mean**	S.D.
a. Meetings with small planning groups at the sites	1	2.8	.5	1	2.5	.6
b. Writing reports/filling out forms	11	2.1	.6	1	2.5	.7
c. Arranging, designing or conducting workshops	3	2.6	.6	3	2.2	.8
d. Traveling from site to site	10	2.2	.8	4	2.1	.7
e. Promoting or explaining the RDU program	4	2.5	.6	5	2.0	.6
f. Working with individual administrators	4	2.5	.7	5	2.0	.8
g. Organizing, preparing, and delivering materials	6	2.4	.7	5	2.0	.6
h. General meetings with site staff	6	2.4	.5	5	2.0	.7
i. Developing yourself professionally	2	2.7	.5	9	1.9	.7
j. Meetings with RDU central project staff	9	2.3	.5	9	1.9	.7
k. Reading materials about R&D products	6	2.4	.7	11	1.7	.6
l. Managing budgets	11	2.1	.7	12	1.6	.7
m. Designing, administering, and analyzing evaluation materials	13	2.0	.7	12	1.6	.7
n. Observing teachers	13	2.0	.7	14	1.5	.7
o. Working with individual teachers	15	1.8	.8	15	1.3	.6
p. Working with parents or volunteers	16	1.6	.7	16	1.0	.3

*Response Scale:
3 = very important
2 = somewhat important
1 = of little or no importance

**Response Scale:
3 = a great deal of time
2 = a moderate amount of time
1 = little or no time

necessary in order to provide appropriate services to schools (NIE, 1976). The notion of organizational linkages as a key feature of the intervention is even more explicit in other agency documents. For example:

> The program hypothesizes that when internal capacity (of schools) is insufficient to supply needed services, the involvement of one or more external organizations (or individuals) may be required. One agency...might not have the necessary capacity and resources to deliver all of the required services. Hence, linkages or arrangements between agencies need to be created to provide necessary resources...(Hutchins, 1976)

The funded projects, on the other hand, tended to emphasize the role of a single individual--a linking agent, field agent, facilitator, or "generalist"--whose responsibility it was to deliver or "broker" services to the school. While the emphasis on the field agent, as opposed to linkage or "linking agencies," varied among the seven funded programs, the field agent played a dominant role from the beginning, and one which tended to grow in importance as the projects matured. Nevertheless, most of the schools involved with the program had at least some experience with project-sponsored training or technical assistance in addition to the services provided through the field agent. As will be seen later in this chapter, such training proved to be a very important aspect of the services delivered and was strongly related to the achievement of some of the program impacts.

These experiences were most pronounced in projects that had a formal design for providing training in problem-solving procedures to the sites. The Florida project, for example, provided two intensive training programs in problem-solving and knowledge utilization skills to two or three representatives of each of the schools that were active clients of its program (see Louis and Rosenblum, 1981, for more detail). Similarly, the schools involved in Pennsylvania's School Improvement Project were served by a "School Assistance Team," which consisted of the field agent, a representative from Research for Better Schools (who was to provide experiential training in problem-solving processes), a representative from RISE, a non-profit information service agency, and a representative from the Learning Research and Development Center (LRDC) at the University of Pittsburgh, who could respond to any questions about basic curriculum issues. In other projects, however, the approach to providing technical assistance, other than that from the field agent, was more ad hoc. In the NETWORK project, for example, the field agent was considered to be the broker of all other services received by a client school. When the agent felt that the school needed technical assistance from another source, he or she would recommend it. The agents also had their own budgets for providing such additional assistance. However, there were no project-wide standards about where or when assistance should occur although all schools tended to get at least some assistance and training related to the implementation of the selected product.

Most of the sites involved in the project got some form of "process training" related to improving their problem-solving practices. In our intensive sample of 90 sites, for example, approximately 55% were estimated

to have had some identifiable training of this type. Most of this was provided by the field agent or other staff of the RDU project. In addition, contact with consultants who were to assist in implementing a planned change activity was prevalent. School survey data indicate that approximately four out of every five schools received some training that was not provided directly by the field agent or other project staff member as part of the program.

In the vast majority of cases this technical assistance or training was directly related to implementing a chosen product, rather than being part of a broader solution to the identified problem: only one out of every five of the schools in our smaller intensive sample had incorporated inservice training activities that were part of solving the problem, but were not directly related to specific implementation issues and problems.

The intensity of training for implementation varied enormously between schools and, since in most cases the training was voluntary, even varied considerably within schools. The survey of teachers indicates that training experiences tended to be concentrated prior to implementation. Pre-implementation training of 25 hours or more occurred for 32% of the teachers, while similarly intensive experiences during the first implementation year were reported by only 20%. Similarly, the percent reporting eight or fewer hours of training was 42% before implementation and 54% during the first year.

The most frequent providers of training and technical assistance related to implementation, other than the field agent, were the product developer and other staff members in the school district. In each case, approximately 2/3 of the teachers reported getting at least some training from people in these roles. While half of the teachers reported receiving training from a consultant who was not the product developer, or a member of the RDU project or their own district, the incidence of this type of supplementary training for implementation was less frequent and occurred "to a very great extent" in only 19% of the cases, as opposed to 38% in the case of product developers.

FIELD AGENT ASSISTANCE STRATEGIES AND CLIENT SATISFACTION

One of the assumptions frequently discussed in the innovation literature is the resistance of schools to external providers of technical assistance. The generic problem of bridging the gap between knowledge producers and potential users by developing "linking roles" has been extensively treated by Havelock (1969). On the other hand, empirical studies of field agents who adopted "linking" roles have indicated that they too may find access to school districts and schools problematic (Louis and Sieber, 1979; Louis and Kell, 1981). In this section we explore the ways in which the field agents' approach to technical assistance and change affects teachers' and principals' assessments of their usefulness.*

*Equivalent data are not available for consultants of other types.

Agent Perspectives and Strategies

As we and others have observed (Louis, Kell, Chabotar and Sieber, 1981; House, 1981; Deal and Nutt, 1980; Sieber, 1972), the ways in which individuals who have responsibilities as change agents view the change process will have major implications for the strategies that they select to carry out their role. Sieber points out:

> As one scans the tactics that are pursued in bringing about focused change in educational systems...one is struck by both the wide variety of approaches and by the high degree of confidence displayed by proponents of each different technique...the many approaches... can be subsumed under three basic strategies, each of which is rooted in a particular image...
>
> (Sieber, 1972, pp. 362-363)

Sieber goes on to define the strategies associated with each set of personal images, but he is ambiguous about whether a change agent's strategies arise from the agent's views of the school change process, or whether the agent develops a coherent set of images to correspond with his or her preferred strategy. Our own position is that the belief system, or personal imagery, that individuals bring to the task of organizational change will condition their willingness to select various strategies to support or stimulate change. Thus, in some sense, the personal imagery of the agent is a surrogate way of looking at the overall "game plan" which change agents or field agents are likely to adopt.

Through focused but unstructured interviews with field agents and school personnel we have identified three different perspectives about what is of primary importance in accounting for the outcomes of any activity or events in schools. The first of these images is the structural perspective. This perspective emphasizes the social structure of the school as a formal organization and the ways in which this must be altered in order to allow change to occur. A second dominant perspective is the individual incentives perspective, which emphasizes individual needs, incentives, and disincentives for change. The final significant imagery is the political perspective, which emphasizes the need to understand--and manipulate--the power structure of the school in order to implement change programs.

Each of these images clearly suggests strategies for change. Thus, for example, we would expect the agent who believes in the individual incentives perspective to spend more time working through individual acceptance and participation in decision making than one who believes in the political perspective. Similarly, a structural approach might emphasize developing a plan for how a new curriculum package would affect the job definitions and informal social structure of the school (e.g., teacher time for socializing and exchanging information) while a political orientation might attempt to look for the interest groups that would be the biggest barriers to carrying out the implementation plan.

The major question to be addressed in this section is whether the field agents' images of the change process are related to their perceptions of client success, and clients' assessments of field agents' performance.

Measures of Perspectives on Change

The three perspectives were measured by asking the agents to complete a set of six forced-choice questions. Each question paired a statement reflecting one of the perspectives with a statement reflecting another perspective. Each time the field agent made a choice, he or she was given a score of one for the orientation that they chose. Thus, the possible range for each orientation was between zero and four.

In addition to these direct measures of perspectives on change, we also use a measure of field agent innovativeness as a surrogate for the degree to which the agent is likely to choose highly visible, novel, and creative strategies for initiating change, versus low-keyed, facilitative strategies. The measure of innovativeness involved forced-choice selection between pairs of adjectives describing the respondent's behavior. Four innovative characteristics (independent, flexible, original, and self-reliant) were paired with four conventional characteristics (dependable, cooperative, industrious, stable). An innovativeness score is obtained by adding the number of times an innovative adjective is selected over a conventional adjective. (See Price, 1972, for more information about this measure.) Support for viewing innovativeness in this way may be found in its correlation with other strategy measures. It is positively correlated with both a political perspective ($r = .22$) and an individual incentives perspective ($r = .30$).*

Client Assessments of Agent Performance

Four measures of client evaluations of the agent's performance are used. Two of these are direct: teachers' ratings of the effectiveness of their agent on 13 dimensions, and principals' ratings on the same scale. In addition to this direct assessment of field agent performance, both teachers and principals were asked for their assessments of the process which the agents had led them through. The measurement of these four outcomes is discussed in detail in Appendix B. Finally, clients were also asked for global assessment of agent services in a battery which also included items for other providers of technical assistance.

Analysis and Findings: Agents' Perspective and Strategies and Client Satisfaction

Perhaps the most outstanding finding regarding the different perspectives on change is a simple descriptive one: field agents overwhelmingly eschew a "political" strategy for creating change, one which emphasizes power groups both as facilitators and potential blocks (Table 6-3). By far the greatest consensus among them is a preference for an individualized approach to change, which stresses working through individual motivations, concerns and reactions. Not only is the mean preference for this modus operandi highest, but the variance among agents is relatively low.

*Note that these correlation coefficients are computed based on 48 linker respondents. The correlation matrix at the end of this chapter, on the other hand, involved linking all field agent scores to each site with which they worked. Thus, they are not comparable.

Table 6-3

MEANS AND STANDARD DEVIATIONS FOR
THREE FIELD AGENT PERSPECTIVES ON CHANGE

(N=47)

Field Agent Perspective	Mean*	Standard Deviation
Political Perspective	.88	1.21
Social System Perspective	2.34	.97
Individual Incentives Perspective	2.71	.78

*Scale ranges from 0-4.

The preference for the individual incentives approach is not surprising. As Deal and Nutt (1980) have noted, it is the popular approach for most educators:

> Many administrators find individual personalities--although complex and volatile--easier to understand than the dynamics of complex systems such as schools and school districts. They often overemphasize the cohesiveness and rationality of the system and their own ability to control...the activity and sentiments of others.

The emphasis upon the individual incentives strategy for creating change has been critiqued elsewhere (see Deal and Nutt, 1980; and Louis, Kell, Chabotar and Sieber, 1981) where it has been observed that this strategy ignores the importance of the formal organizational structure of schools. It should be noted, however, that the field agents typically supplemented the preferred individual approach with a large dose of structural strategy, which involves understanding roles, divisions of labor, and rational organizational planning processes.

Does the lack of sympathy toward a political strategy represent an imbalance in the "bag of tricks" that field agents use to create an appropriate environment for change? As we shall see below, the answer is a mixed one, but, on the whole, we can conclude that agents might profit from a greater recognition of how power works in formal organizations--and how the change agent can plan to use the power system to facilitate participation and rational planning.

Overall we found that clients tended to be very satisfied with the services provided by the field agents. When teachers were asked to rate their overall satisfaction with various sources of personal assistance provided to them during the project, the field agents were rated as most helpful by the teachers and principals who resnjg!x! bj bcx oev?xtk Product developers were rated as considerably less helpful by both teachers and principals (Table 6-4).

Simple correlations between teacher and principal satisfaction with the process and with the field agents, and the measures of agent perspectives and strategies are shown in Table 6-5. This table reveals that an innovative orientation on the part of the agent has a negative impact on principal and teacher satisfaction with the RDU process, and their assessments of the helpfulness of the agent.

Because the finding that innovativeness has such strong negative relationships with site perceptions of agents is not necessarily consistent with all of the literature about desirable personality characteristics of change agents, it is useful to speculate a bit further about the meaning of this relationship. First, it may be noted that the concept of innovativeness includes some characteristics that are thought to be positively associated with effective change agents--flexibility, and the ability to be self-reliant. On the other hand, it also incorporates other attributes that may be less compatible with "linking agentry"--namely, originality and asking questions. Boundary-spanning persons are often expected to be both

Table 6-4

SATISFACTION OF TEACHERS AND PRINCIPALS WITH VARIOUS PROVIDERS OF TECHNICAL ASSISTANCE AND TRAINING

	Not Satisfied			Very Satisfied		Total
	1	2	3	4	5	
Teachers						
Field Agent (N=461)	5%	10	25	29	31	100%
Other RDU Staff (N=304)	8%	13	35	29	15	100%
Product Developers (N=562)	11%	11	28	27	24	100%
Other Consultants (N=307)	9%	11	34	27	19	100%
Principals						
Field Agent (N=134)	1%	9	17	32	40	100%
Other RDU Staff (N=118)	2%	7	29	40	23	100%
Product Developers (N=118)	3%	8	31	36	22	100%
Other Consultants (N=118)	3%	13	28	31	25	100%

Table 6-5

PEARSON CORRELATION OF FIELD AGENT PERSPECTIVES AND STRATEGIES AND CLIENT SATISFACTION

(Significant Correlations Only)

FIELD AGENT PERSPECTIVES AND STRATEGIES	TEACHER SATISFACTION WITH PROCESS	TEACHER SATISFACTION WITH AGENT	PRINCIPAL SATISFACTION WITH PROCESS	PRINCIPAL SATISFACTION WITH AGENT
Extent of Agent Innovativeness	-.17	-.28*	-.31*	-.33*
Agent Political Perspective	-.28*		.24*	.26*
Agent Individual Incentives Perspective	.20*			
Agent Structural Perspective				-.19*

**Significant at the .05 level.

innovative and able to fade into the background--an expectation that is probably unreasonable.

The need for low-keyed, dependable, cooperative, and industrious behavior is clear, not only from the statistical findings presented here, but also from the interviews with both field agents and clients. The field agents emphasized the low-keyed, non-initiating part of their job as a key to success ("let them think they did it--you're just the support"). Clients praised the agents for their ability to chair meetings and organize support, but not for their imagination or originality. The need for non-innovative personality characteristics may be particularly critical in the case of the external change agents, where, as outsiders, their legitimacy to introduce novel or original ideas is suspect. However, we suspect that even for the inside change agent, self-reliance or originality is less important in creating a mandate for change than cooperativeness and stability.

Also shown in Table 6-5 are the findings that field agent perspectives on change have scattered relationships with the outcome variables. The more pronounced the individual incentives orientation of the agent, the more satisfied teachers are with the process ($r = .20$). This is probably a result of the fact that an individual incentives model is more teacher-centered than the other two. A political perspective on the part of agents, on the other hand, has a negative relationship with teacher satisfaction with the process ($-.28$), but is positively associated with principal satisfaction with the agent ($r = .26$) and the process ($r = .24$). Since the political orientation is associated with strategies to use the power structure to achieve change, an agent holding such views would be very likely to spend more time with administrators than teachers, thus causing these results (see Louis and Sieber, 1979, for additional data to support this).

Overall, the findings suggest that the perspectives and strategies that the agent chooses to bring to the relationships with clients do have an impact upon clients' assessments. However, the only clear pattern that emerges from the analysis is that agents who are highly innovative in their orientation are less likely to be successful. The scattered quality of the relationships between other independent and dependent measures indicates that different perspectives may work well in some settings, and with some role groups, and less well in others. Thus, we are led to the tentative conclusion that there is no one strategy that is particularly effective (or ineffective) in schools. Rather, the relationship between agent and client is probably much more complicated and dependent upon local features. Based on our case materials, however, we also believe that the sparse findings emerging from this analysis may be more a reflection of the difficulty of capturing these elusive relationships between agents and their clients than of their actual significance.

In addition to the simple correlational analysis, canonical correlations were computed to examine the total effect of the perspectives and innovativeness as a group upon client satisfaction. The first canonical correlation of .47 was significant at the .005 level. Correlation coefficients for the first canonical correlations are presented in Table 6-6. This table confirms that innovativeness and the political orientation are

Table 6-6

CANONICAL CORRELATION COEFFICIENTS BETWEEN CLIENT SATISFACTION AND AGENT PERSPECTIVES

(N= 38)

Group I		Group II	
Client Satisfaction	Corr.	Agent Perspectives	Corr.
Teacher Sat. W/Agent	.78	Individual	-.47
Prin. Sat. W/Agent	.71	Political	.62
Teacher Sat. W/Process	.07	Structural	-.37
Prin. Sat. W/Process	.75	Innovativeness	-.72

Canonical correlation: .47, significant at the .005 level

the most powerful variables in predicting client satisfaction. Specifically, to repeat earlier findings, innovativeness relates negatively to all four measures of client satisfaction--teacher and principal satisfaction with the process and with the agent; the political perspective is also related positively to these measures, leaving out teacher satisfaction with the agent.

THE IMPACT OF EXTERNAL TECHNICAL ASSISTANCE ON SCHOOL IMPROVEMENT OUTCOMES

The logic and literature supporting the anticipated impact of field agents and consultants on local school improvement activities were discussed in Chapters 1 and 2. However, there is still controversy over whether external technical assistance has significant positive effects on local change efforts. Current research to date supports a full gamut of answers to that question, ranging from assertions that external consultants actually harm local change activities (Greenwood et al., 1975; Berman and Pauley, 1975), to those who find strong positive effects (Louis and Sieber, 1979; Emrick and Peterson, 1976; Miles et al., 1978). An important question that we seek to answer is, therefore: what is the overall impact of external change agent activities upon school improvement processes?

In addition, there is a second controversy that we seek to address, which focuses on the degree to which generalist field agents or more specialized trainers are important, and how each type may contribute to innovation at the school level. Thus, for example, Zaltman and Duncan (1977) argue that strong specialization and expertise are extremely important criteria for any external change agent and that low levels of expertise will undermine credibility and impact. Other studies, however, have indicated that generalists and specialists may have similar impacts upon knowledge utilization among educators (Louis, 1975). Still others imply that generalist agents may have more impact in the pre-implementation stages, while specialists have more impact in the later stages. Thus, a question that will be addressed is: what is the relative impact of field agent assistance and specialized consultant assistance?

Measures of External Technical Assistance

Seven measures of external technical assistance were used in the analysis. Two of these refer to the "expert" training and consulting assistance provided as part of the project: total amount of training received and variety of providers.*

Five measures relating to field agent activity were used: field agent initiative in providing services, field agent intensity of services, the amount of contact between the field agent and the principal, and the

*Total amount of training was computed by adding the percentage of teachers reporting more than 25 hours of training before implementation to the percent reporting more than 25 hours after implementation. Variety of providers was computed by adding the number of different types of providers from a list including district specialists, other district staff members, product developers, field agents, other project staff, and other consultants.

measure of field agent innovativeness and political orientation that emerged as significant in the previous section.*

Analysis and Findings: Agent & Training Impacts

An examination of the correlations between six school improvement outcomes and the seven measures of external technical assistance indicates that three of the external assistance variables seem to have relatively little impact (Table 6-7). While, as we saw previously, an innovative or political orientation may have negative impacts upon client assessments of agent performance, it is not significantly correlated with any of the dependent variables. In addition, principal estimates of their contact with the field agents does not affect the actual outcomes of the change process (with the exception of organizational change).

Two additional field agent variables do correlate strongly with several of the outcome variables, however. Field agent initiative and intensity are correlated at the .01 level of significance with the overall index of organizational improvement, with program incorporation, and with the scope and magnitude of change in the school.

The correlations between the two variables measuring the amount of training and the variety of training sources show even stronger relationships with the dependent variables, however. In both cases, there is a significant correlation with each of the outcome measures, and these are equal to or exceed the magnitude of the correlations between field agent variables and outcomes.

Table 6-8 presents the results of the regression of the six dependent variables upon the seven external technical assistance measures. The results indicate that the external human assistance provided to schools can have major impacts upon the degree to which knowledge is used and school improvement occurs. Technical assistance and training activities have particularly potent impacts on overall organizational change and program incorporation,

*Field agent initiative was measured by adding together 13 variables from the consolidated coding form: 10 of these variables were measures of the degree to which agents delivered more intensive types of services (such as providing training, or helping to diagnose the problem). An additional measure examined field agent influence over the school's decisions at four stages in the process, and was measured similarly to the internal site actor's influence discussed in Chapter 7. Another measure estimated the importance of the agent to the school's activities. The last measure tapped the amount of initiative used by the agent in his/her attempts to influence the schools. Intensity of services is composed of variables indicating the proportion of local team meetings attended by the agent in the four stages of the problem-solving process. These measures are from the consolidated coding form. The measure of agent-principal contact is a single indicator from the principal survey, which asked the respondent to estimate the amount of contact on a four-point scale ranging from "a lot" to "none."

Table 6-7

PEARSON CORRELATIONS BETWEEN MEASURES OF
SCHOOL IMPROVEMENT AND EXTERNAL TECHNICAL ASSISTANCE VARIABLES

(N=75)

School Improvement Outcome	External Assistance Variables						
	Field Agent Initiative	Field Agent Intensity of Services	Contact Bet. Field Agent & Principal	Agent Innovative-ness	Political Orientation	Total Amount of Training	Variety of Training Sources
Organizational Impact	.33**	.33**	.26*	-.09	-.02	.44**	.44**
Process Incorporation	03	.02	.10	-.07	.05	.27*	.30**
Product Incorporation	.34**	-.40**	.22	-.06	.02	.31**	.59**
Scope of Implementation	.48**	.49**	.12	-.11	-.08	.40**	.41**
Problem Solved	.22	.19	.20	-.15	-.00	.33**	.38**
Personal Impacts	-.01	-.10	.11	-.04	-.07	.34**	.26*

* $p \leq .05$
** $p \leq .01$

Table 6-8

STANDARDIZED STEPWISE REGRESSION (BETA)+ COEFFICIENTS FOR THE RELATIONSHIP OF EXTERNAL ASSISTANCE AND SIX MEASURES OF SCHOOL OUTCOMES
(N = 76)

External Assistance Variables	School Outcomes					
	Organizational Impacts	Product Incorporation	Process Incorporation	Problem Solved	Scope of Implementation	Personal Impacts
Field Agent (FA) Initiative					.24*	
FA Time on Site	.19	.23**			.31**	-.18
FA Political Perspective					-.13	
FA Structural Perspective						
FA Innovativeness						
FA Contact with Principals	.16*			.13		
Amount of Training	.33**	.10	.17	.24*	.28**	.26**
Variety of Training Sources	.25*	.43**	.22*	.31**	.19	.21*
Multiple R^2	.40	.43	.14	.21	.46	.19
Adjusted Multiple R^2	.36	.40	.10	.17	.41	.14

+ Beta Coefficients are presented only for those variables which contributed to the reported multiple R^2. The selection process was stopped when additional variables failed to increase the Multiple R^2 by 1% or more; the order of entry was unforced.

* $p \leq .05$
** $p \leq .01$

where 36% and 40% of the variance are explained respectively. Only process incorporation and personal impacts are poorly explained by the level of human assistance.

Three variables stand out as being most important, and of these, one is related to field agent behaviors, and two are related to training. The amount of training received by the site staff prior to implementation and after implementation has a strong positive effect, and this impact is augmented by having training provided by a variety of different types of people. The time that the field agent spends with local site committees or "problem-solving teams" is predictive of several dependent measures.

Our site visits revealed that much of the importance of the agents can be attributed to the role they played on site both in stimulating committee members to stay active and reach decisions and in providing logistical support to ensure that the meetings were scheduled regularly, that suggestions for consultants were obtained, etc. Thus, the actual presence of the agent on site was important.

For example, in one school that we visited, the staff members referred to the field agent as "our superego--she gave us the kick that we needed; she'd tell us what we had to do..." In another case, the field agent was viewed as instrumental in raising disagreements between staff members that would have otherwise gone unresolved:

> (The field agent) was sensitive to the fact that consensus did not exist on any definition of the problem, but that group members were willing to claim they agreed in order to avoid conflict...For three long meetings the (group) grappled with problem identification. Whenever Hartwell detected differences of opinion, she would state what she thought was the source of the difficulty and invite discussion...demonstrations of her genuine interest in the group helped her to establish warm personal bonds with the teachers at Jefferson. (Kraus, 1981)

Only spending a great deal of time with members of the school allowed the agent to play a role such as that described above.

In many cases, staff members did not explicitly recognize the significance of the field agent to their activities. This may be in part a consequence of the general reluctance of schools to admit to influence by external actors (Louis et al., 1980:286-88; Miles, 1981), and in part because some of the agents who spent a great deal of time and energy working with clients had, nevertheless, a sufficiently low-key style that their contributions were very unobtrusive:

> Milton had no desire to act like a pushy expert and was content to keep a low profile, offering only an occasional comment. If the group had no need for his skills as facilitator, they did look to him as a resource person... (Desmond, Louis and Murphy, 1981: 194)

The Relative Impact of Field Agent Assistance and Specialized Training Assistance

There is a tendency, revealed both by the quantitative and qualitative data, for the two types of external human assistance to have somewhat different impacts on the site. Generalists and field agents have their greatest impacts in stimulating the school staff to define their problems more broadly, and to think more ambitiously about what might be done to solve them, thus producing a change program of greater magnitude. The multiple R^2 for scope, for example, is the only regression equation in Table 6-8 that is dominated by field agent variables. Field agents and clients in "successful" schools often agreed that a major effect of the problem definition and solution selection process, in which field agent activity tended to be greatest, was to increase both the breadth of interest among potential users and to result in a "solution" that required more change on the part of the teacher.

Did this mean that agents were, in fact, "product pushers," who advocated for more major changes? The answer to this is, typically not. Case materials reveal that most agents bent over backwards to refrain from influencing the actual product that was chosen:

> (The agent) did not like the ECRI program, and privately remarked that she would not want her own child in an ECRI class. Even so, she assumed a professional neutrality and pushed for a fair consideration of it. (Kraus, 1981:204)

In another case where the agent wished to work through local administrators in a more centralized decision-making process, the school-based team nevertheless had a great deal of influence:

> (The agent and two district administrators) then began to look for information on promising career education materials...after reviewing the ones that were unfamiliar [to them] they selected ten for review by the teachers who would be implementing the products...During the period from April to July the team met...to discuss and sift through the products (and make a selection). (Halpern, 1981)

In the above case, the agent had a direct influence on scope by presenting products that were highly varied in content and materials, but which were all based on the notion of infusing career education through major portions of the curriculum. It is important to note, however, that the impact of field agents on outcomes appears to occur both directly (by achieving broader scope of implementation and, to a lesser degree, incorporation of the new program or practice); and, to an even greater extent, indirectly (by influencing the problem-solving process in school).* For example, both the

*The degree to which the activities of external change agents predict the quality of problem solving in schools is discussed in greater detail in Chapter 9.

amount of field agent time spent in the school, and the level of field agent initiative and activity are strongly correlated with the level of effort (measured in number of person days) expended by the team members and other participants in the school (r = .35 and .43, respectively, both significant at the .01 level). Similarly, the quality of the problem-solving process used in the school is significantly correlated with both these measures of field agent characteristics (r = .23 and .27, respectively, both significant at the .05 level). Finally, there are significant positive correlations between these measures and the level of broadly-based faculty participation in decision making (r = .23 and .26, both significant at the .05 level).

These findings are not surprising based on observations of field agents in action. For the most part, agents tended to dominate the delivery of services in the early stages of each school's problem-solving process. They were of critical importance as generalist supporters of the schools' efforts to develop a better definition of their problem and a structure for decision making and in assisting them to develop criteria and a process for determining what available products should be reviewed. As we have noted earlier in this chapter, the role of generalist as "process" helper was the one that they themselves felt most comfortable with. Thus, it appears that to a very large degree the more active field agents were achieving what most of them hoped for--to improve the quality of the problem-solving process, to increase the salience of problem-solving activities in the routine of the school, and to make problem-solving and decision making more participatory.

Once a product had been selected for implementation, on the other hand, the school staff's interest and center of activity turned to the specific content of the innovation and the need for focused training for implementation, rather than to decision-making skills. Most field agents had little expectation that they would play a strong role in implementation (as noted earlier in Table 6-1), nor did they see themselves as content specialists.

While most RDU projects had a clear differentiation of roles for process assistance (i.e., the field agent role) and for product information assistance (i.e., the knowledge-base specialists), the actual job definitions for the field agent were largely ambiguous. Some viewed themselves as resource persons and coordinators and expended a heavy effort in developing their roles for the early stages of the problem-solving process. They received little preparation or orientation from either the project headquarters or their own host organizations for their appropriate role and activities in the pre-implementation and implementation phases. Many appeared to lack the instructional design or supervisory skills that would be most useful during implementation, or had difficulty applying the relevant skills which they might have had. Furthermore, the ambiguity of their position was augmented when faced with the need to define a role which would be both compatible with and different from that carried out by the technical experts who were brought in to assist in implementation activities.

For example, one particularly forthright agent expressed great anxiety after her schools had chosen products, saying that she could not really figure out what her role should be during the year and a half they would be implementing the new program. She, and other agents, cautiously

tried out new roles, including designing and helping to carry out evaluation programs, or brokering (and occasionally compensating for) other external resources of a more technical nature. Others simply became involved in new activities, either in different schools or with the same clients.

The relative importance of technical expertise in implementation and the actual determination of the degree of change and improvement in a school is revealed by Table 6-8. While field agent activities had little impact on measures of overall school improvement, the degree to which the problem was solved, and process incorporation, both the amount of training and variety in the types of training provided was important to each of these outcome variables. The contribution of the two is particularly impressive in the case of overall school improvement and the degree to which the problem was solved. In the case of these outcome variables, both field agent and training variables contribute one percent or more to the overall adjusted multiple R^2. However, the relative contributions are distinctively different, with the standardized regression coefficients being much greater for the variables reflecting formal training activities. In summary, the message of Table 6-8 (as well as the simple correlations in Table 6-7) is clear: effective training is a key to effective school improvement programs.

Site visit data lead us to the observation that the statistical relationships shown here obscure something of a "chicken-and-egg" problem. Heavy local interest in external and internal training activities tended to occur in those schools that were already well on their way through a successful school improvement program. While interviews with teachers suggest that training activities were important to sustain commitment and ensure appropriate implementation of the product, effective training typically did not stimulate most of the impressive school improvement outcomes, but rather reinforced them in significant ways.

The notion that effective training is an outcome as well as a cause of a school improvement process is suggested by the correlation of training variables with other indicators of the "quality" of the process. This measure reflects early activities as well as those occurring in preparation for or during implementation (the periods during which training typically took place and to which our training measures refer). The level of effort devoted to problem solving in the school and the quality of the problem-solving process are both correlated with the variety of trainers ($r = .29$, sig. $\leq .05$) and ($r = .34$, sig. $\leq .01$). Similarly, schools with high levels of faculty influence tended to have more training (.26, sig. $\leq .05$) and more different trainers (.27, sig. $\leq .05$). Finally, broad-based involvement in solution selection, which preceded the choice of trainers involved in preparing for implementation, was strongly correlated with a variety of trainers (.29, sig. $\leq .05$).

In fact, qualitative data and the observations of field agents tend to suggest that in many cases the most effective schools shifted from depending on their field agent as a major source of external stimulus to depending on a single or set of technically expert training sources during implementation. While the shift was rarely complete, it was often substantial in cases where appropriate and excellent trainers were available. Schools which were lucky enough to choose products accompanied by relatively

inexpensive and enthusiastic developer/trainers tended to become the most committed to their new course. Particularly important, according to many of the sites that were visited, was a trainer who later returned several times after the first pre-implementation training session, or who was available for telephone consultation. Another very effective mode in a few sites was "turnkey training," where a limited number of staff members or administrator/specialists received intensive training, usually at the developer's own school, and then returned as local experts. Obviously the staff who went benefited more than those who stayed behind, but an on-site presence was helpful.

The difference between the impacts of field agents and other "trainers" is nowhere more evident that in the case of staff development outcomes. If the simple correlations are examined (Table 6-7), it appears that field agent behaviors have no impact upon staff development outcomes, while training variables are quite strongly correlated. In the multiple regression, this finding is further augmented. The standardized regression coefficients for variables contributing at least one percent to the adjusted multiple R^2 include both training variables, which have a positive relationship with staff development, and field agent time spent with the team, which has a negative relationship (significant at the .07 level).

A number of issues are raised by this finding. First, it implies that while schools can effectively implement externally developed products without having to "reinvent the wheel," and that an active field agent can effectively help to assist in this process, high levels of involvement from an external facilitator may inhibit the development of strong internal capacities at the individual level. We did not observe many instances in which it was apparent that a field agent's presence inhibited the emergence of internal leadership among the teachers, but it is possible that more staff development occurred in those sites which had field agents who did not or could not take on all of the facilitating responsibilities associated with carrying out the process.

Trainers, on the other hand, whose contact with the schools tended to be much more episodic and limited in duration, as well as more focused and specialized, were apparently able to facilitate both personal growth outcomes and program implementation outcomes. We believe that the explanation for this finding lies in the fact that during the pre-implementation and implementation activities--in which the trainers were most substantially involved--most teachers were able to focus on actual problems they faced in the classroom. The experts were typically screened and selected to provide training targeted to a specific need for information or skills associated with the program being implemented. Thus, it provided teachers with skills and ideas that they could use right away. It seems that teachers are likely to benefit most when they focus their energies on needs that are central to their daily work life in the classroom (see also Huberman, 1981). This finding does not obviate the importance of broad involvement in the problem-solving activities (which are discussed in the following chapter). What it does suggest is that it is crucial to get to the "bottom line" of teacher needs if effective staff development is to occur.

Having found one instance of a possibly negative impact of involving external field agents in a local school improvement process, it is reasonable to ask whether other negative impacts may be found. Among the possible negative effects that may be postulated are that external field agents will: (1) simply supplant activities that would have been carried out equally well by school staff; (2) attempt to inappropriately monopolize the training and service provision role with client schools and possibly avoid calling in technical experts when they are actually needed; or (3) tend as outsiders to make mistakes in judgement which may impede the acceptance of new solutions to local problems. We have already addressed the first issue, having indicated that field agent involvement was positively related to indicators of local level of effort and initiative. The question of whether field agents will tend to try to dominate a local problem-solving process even in areas where they are not competent to provide training cannot be supported, for we find that both agent time and agent initiative and activity are positively correlated with the variety of training received (.28, sig. $\leq$ .05), suggesting that, if anything, they are more likely to propose the use of alternative human resources. Finally, our qualitative data indicate that most agents were extremely careful to work very slowly with the local schools until they understood the "culture" of their environment quite well. The data suggest that the external agents were quite effective in stimulating a "bottom up" approach to problem solving, rather than the "top down" approach that is more typical when the district office calls in an "expert" to solve the problem. In school after school, teachers expressed the belief that the process they were participating in was qualitatively different and significantly more participatory than previous committees on which they had worked. Indeed, in some instances, it was the first time teachers felt that they had the opportunity to select a new program to be used in their school, as opposed to ratifying a selection made by the principal or central office. In summary, there is no evidence to suggest that there was any significant pattern of external agents producing negative effects on outcomes in the local district.

SUMMARY

The provision of external technical assistance was a major component of the RDU intervention strategy. In this chapter the several types of external assistance provided were discussed, the impact of the perspectives and strategies applied by the external agents were related to client satisfaction with external assistance, and the impacts of external assistance on school improvement outcomes were examined. Based on the above data, the following conclusions may be drawn:

- Most of the schools involved in the program received two quite different types of external technical assistance. Field agents, who were at least part-time employees of the projects, typically provided more ongoing and sustained assistance to the schools. Field agents (and their clients) typically viewed their appropriate role as resource persons and coordinators, who were there to facilitate the schools' progress.

- In addition, most schools also received focused training from substantive experts who assisted the sites in program implementation. The prevalence of this role differentiation in technical assistance is a dramatic testimony to the impact of Havelock's "linkage" model on practice, since it was neither required nor even hinted at in the original program RFP.

- Field agents were perceived by teachers and principals as more helpful than the providers of specialized assistance. Overall, clients preferred sustained support rather than episodic training events. Clients were particularly satisfied with field agents who displayed high levels of initiative in providing assistance, and those who spent a lot of time on site. On the other hand, field agents who were self-reportedly more innovative were not perceived as helpful.

- Both field agents and specialized trainers had significant positive impacts on school improvement outcomes and, in general, the more assistance received by both types of technical assistance providers, the greater the benefits. However, despite the field agents' popularity with clients, the amount and variety of training from "experts" had a greater impact on school improvement.

A major implication of these findings is that it is important not to confuse measures of client satisfaction with technical assistance with the actual impacts of that assistance. In addition, we should also note that the impacts of technical assistance strategies on long-range school improvement outcomes are not equivalent to the full range of benefits that schools may obtain from receiving technical assistance. For example, as we have argued, field agent activities may have indirect effects upon school problem-solving behaviors. In addition, other studies have shown that field agents have significant impacts in both recruiting clients, and sustaining their involvement through adoption (Louis and Sieber, 1979; Emrick, 1977). We believe that our findings tend to support the notion that different agent roles may be appropriate at different stages in the problem-solving process, as has been argued by Crandall (1976), and this important topic is raised again in Chapter 9. On the other hand, we should not ignore the alternative explanation that the value of trainers and training in producing long-term impacts, as opposed to generalists and facilitators in producing more proximal outcomes, is in part, confounded by the fact that few of the RDU technical assistance providers were able to conceive of their roles as encompassing both generalist and expert assistance strategies. In other words, pre-adoption and post-adoption technical assistance needs may be different, but it is certainly possible that one individual could fulfill both, at least to a greater extent than occurred in the RDU program.

CHAPTER 7

IMPACTS OF THE INTERNAL PROBLEM-SOLVING PROCESS*

INTRODUCTION

As mentioned in Chapter 2, the R&D Utilization program was focused not only on the alleviation of a specific problem in each site school, but also on the lasting improvement of each school's problem-solving capability. In this sense, the RDU program was engaged in organization development and capacity building, as well as in knowledge dissemination. Each project included in its design a number of steps which each site was expected to accomplish as part of a rational problem-solving/knowledge utilization model. In addition, each project required or encouraged broad-based participation in the sites' problem-solving procedures.

Although specific procedures varied across projects, there were certain key characteristics present in each project's problem-solving model. The common characteristics are: (1) thorough analysis and prioritization of school needs or problems before searching for school improvement strategies; (2) a search outside the local school system for assistance and information, especially on alternative solutions to the identified problems; (3) systematic examination of the alternatives, according to explicit criteria; and (4) a preference for solutions that had been field tested and empirically validated.** In addition, the projects generally required sites to develop comprehensive pre-implementation plans or proposals, which then had to be approved by project staff. Broad-based participation in the problem-solving process was encouraged through the formation of local problem-solving teams, known as "site teams," "decision-making groups," "local action teams," and "task forces" in the various projects. Most projects insisted that both teachers and administrators be represented on the teams. Several projects also encouraged input from the faculty as a whole, through surveys, polls, or faculty meetings.

Within the outlines of a project's problem-solving model there was substantial room for variation. Indeed, not all sites adhered closely to their projects' suggested procedures. An example was a middle school whose "decision-making group" consisted of four teachers, a counselor, the principal, and the assistant superintendent for curriculum. The group discussed problems and selected a program during a two-day workshop which was also attended by their field agent. (There was no input from the faculty as a whole.) The problems identified by the group were very general, diffuse, and not prioritized; they also skipped the procedure for specifying program selection criteria. Additional information on the products was obtained through several long-distance phone calls during the two-day workshop. A training session held for the entire faculty was a poor introduction to implementation, since the planning had not taken into account the differences between the adopting school and the original implementation site. As a result, most of the school's teachers became disgruntled and later withdrew from the program.

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*This chapter was written by Diane Kell.

**Most projects required sites to select solutions from the projects' own knowledge bases. Since the projects specialized in solutions for problems in reading, math, and/or career education, there was a limit on the types of problems that could be addressed through the RDU program.

At the other extreme was an elementary school which took three years to identify and analyze the school's instructional problems, select a program to alleviate those problems, and prepare for implementation. The process began with a one-hour orientation session for the entire faculty. Members of an external consultant group later visited the school to conduct individual interviews with the teachers and to observe their classrooms. Next, a preliminary analysis of school problems (based on the visit) was shared with a "local action team," including six teachers, a counselor, the assistant superintendent for curriculum, and the principal. During the following months, eight full days of team meetings were devoted to further specification of student and program needs. Between meetings, a great deal of effort was expended collecting and analyzing data through teacher interviews, student testing, and other means.

One year after entering the program, the school completed its problem statement. The team then spent two full days developing the criteria for program selection and screening the choices presented to them by the external consultant group. Six options were presented to the faculty during an all-day meeting, and the faculty's choice of a reading management system was later confirmed by the problem-solving team. Several team meetings were then devoted to developing an implementation plan. The local action team next participated in a full week of intensive inservice in the adoption of the reading management system; this was followed by a one-day session for the entire faculty, held two years after the school's entry into the RDU program. Another year was then devoted to modifying the reading management system to meet local site needs and conditions. The entire faculty was involved in this process through grade-level groups headed by members of the local action team. When the program was finally implemented, the whole faculty felt proud of their effort, in spite of feeling that they could have accomplished as much in less time.

A final example illustrates the range of site experiences in the RDU program. At this school all major decisions related to the problem-solving process were made by the faculty as a whole during regularly scheduled faculty meetings. However, a key role was played by three individuals--the principal, a central office resource teacher, and one of the school's first grade teachers--who together acted as the "school facilitators." The facilitators attended two state-wide training sessions to learn how to lead the faculty through the process of defining a problem and selecting and implementing a solution; they were assisted by the project's field agent, who was very actively involved throughout the process. The first activity with faculty was a brainstorming session to identify problems with the school's instructional program. The results were then summarized by the school facilitators and distributed to each teacher for prioritization. Over the next few months the facilitators met several times to work on a problem statement and a request for information on available products. The drafts of these documents were reviewed by key faculty members and submitted six months after the school's entry into the project. When the product options were received from the project, the facilitators met several times to screen the choices and select three for presentation to the faculty. The faculty then met in grade-level groups to discuss the options and rank them in order of preference. The faculty made its final decision on product selection one year after the school's entry into the project. Over the summer there were several days of planning for implementation, involving school and district

administrators, as well as teachers and consultants. The school implemented some aspects of the new program the next fall but received intensive in-service in all components of the program on a monthly basis. Within two years, the changes in the school were profound and involved all aspects of school operations, from teaching methods to school management.

In all three of the above examples, teachers played a key role in decision making. However, there were also sites where, whether or not a problem-solving team was formally established, the decisions were made by school or district administrators. These sites represent yet another variation from the idealized problem-solving models of the RDU projects.

In this chapter, we examine the importance of both rationality and broad-based participation in local school improvement processes, relative to several outcomes which have already been described: organizational impacts on the school; incorporation of the selected program; incorporation of the problem-solving process; the extent to which teachers report the problem solved; scope of implementation; and personal impacts on teachers. More generally, this chapter describes local school problem-solving behavior --including the roles of district administrators, principals, and teachers-- and examines the effects of internal roles on school improvement outcomes.

The following section describes the variables and measures used to assess the internal problem-solving process. The overall impacts of the process, as indicated by stepwise multiple regressions on the outcome measures, are described in the section dealing with "Overall Impacts of the Internal Process on Outcomes." In "Participation and Influence in Decision Making" and "Other Characteristics of the Problem-Solving Process" each component of the process is described and analyzed in greater detail.

VARIABLES AND MEASURES

Most of our data on the internal problem-solving process come from our own site visits and from site case materials provided by the projects. These qualitative data were encoded by members of the study team, using the consolidated coding technique described in Chapter 3.

One group of variables describes the influence that actors in various role groups within the school system had over major decisions in the school improvement process. Separate items were developed for each role group during each stage of the process: problem identification; solution selection; planning for implementation; and ongoing implementation monitoring, evaluation, or planning. Coders were asked to select the response category which described the most influential member of the role group, rather than the average degree of influence of members of the group.* The role groups

*The response categories for each item were:

None or very little: Had little or no input into decisions, and little or no influence.

Some: May have had considerable input into decisions but was not a strong influence.

A great deal: Strongly influenced the decisions; may have made the final decisions alone.

considered in the analyses were the superintendent or assistant superintendent, other central office staff, the principals or assistant principals, and teachers.* We also measured the influence of the faculty as a whole and the problem-solving team. In both these cases, coders were asked to assess the degree of influence exercised by the group as a unit rather than as individuals. A single measure of influence across problem-solving stages was computed for each group.**

A second group of variables describes breadth of involvement during each of the problem-solving stages. These variables were constructed from items on the consolidated coding form assessing the extent of involvement of the most actively involved members of each role group during each stage of the process. Since the scores were added across role groups to measure breadth of involvement, this group of variables takes into consideration not only the number of role groups participating in the process, but also the extent of their involvement. The role groups included in the measurement of this group of variables were the superintendent or assistant superintendent, other central office staff, the principals or assistant principals, teachers, and other school-level staff.

A third group of variables describes the level of effort, in person-days of local staff time, for each stage of the process. Total level of effort across stages was computed by adding the items.***

Finally, there are two groups of variables which describe the "quality" of the local process. The first assesses congruence with "sound" group decision making practices, and the second measures congruence with a "rational" problem-solving model. The criteria for assessing quality of group decision making and quality of the problem-solving process were adapted from criteria developed by Sam Sieber on the basis of a review of the literature. The criteria and instructions to coders are reproduced in Appendix F.****

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*In addition, the principals' assessments of their own involvement in the schools' problem-solving activities were taken from the principal survey. The scale is composed of four items corresponding to the four stages of the process. The variable was included in the analyses to test the hypothesis that an active, though not necessarily directive, principal is important to the success of school-improvement efforts. However, since the variable was not powerful in the analyses, it will not be discussed further.

**Variables spanning the stages were computed by adding the responses for each stage, excluding the implementation stage, which had a larger proportion of missing cases.

***For each stage, coders could choose from the following response categories:

Low: Less than 10 person-days
Medium: 10 to 30 person-days
High: Over 30 person-days

****Other researchers and practitioners may disagree with some of the criteria; after all, there is no single set of established norms for group decision-making or problem-solving quality. However, since the criteria were drawn from the school-improvement literature and from the RDU projects' own problem-solving models, we believe they are an adequate measure of the extent to which the local RDU processes were consistent with current models for rational, participatory school improvement, and thus they are adequate for determining the strength of the relationship between adherence to these models and success in a school-improvement effort.

OVERALL IMPACTS OF THE INTERNAL PROCESS ON OUTCOMES

As shown in Table 7-1, only one of our quantitative measures of school improvement outcomes, organizational impacts, can be predicted very well with the internal process variables. This corresponds to our analysis of case data, which suggests that many sites arrived at "successful" school improvement outcomes via a wide variety of locally-designed routes, despite the projects' attempts to encourage a particular problem-solving approach. In some schools, centralized decision making by the superintendent or principal was highly effective; in others, a decentralized, staff development approach worked well. Nevertheless, our statistical analysis does indicate a modest level of predictive power for internal process variables, particularly for the overall organizational change outcome, but also for the process incorporation outcome, which is not well explained by other aspects of the program intervention (see Chapters 5 and 6).*

Four variables contribute to organizational impacts: the quality of the problem-solving process; overall faculty influence on the process; breadth of involvement in solution selection; and breadth of involvement in implementation (R^2 = .34). Process incorporation (R^2 = .15) is achieved through breadth of involvement in solution selection and implementation (though the beta coefficient on the latter variable is not significant) and through lower levels of influence from central office staff. In general, most of the predictive power of the internal process across all six outcomes is attributable to three variables: overall faculty influence on the process; breadth of involvement in solution selection; and breadth of involvement in implementation. Thus, the most important part of the RDU problem-solving approach appears to be its emphasis on participatory decision making.

One of the surprises of the multiple regression analyses is the fact that principal influence is not a powerful explanatory factor, even though it is correlated with several outcomes. Our analysis of narrative data on the sites indicates that, in many of the most successful schools, principals facilitated the process of planned change, but preferred to let the process be teacher dominated. Thus, while not totally passive, the principals in successful schools did not always receive high scores for influence. This does not mean that they were ineffective leaders, but merely that they chose a nondirective leadership style. This point is discussed further in the following section, and in Chapter 9.

A second surprise is that the process does not predict level of staff development benefits, or personal impacts, reported at a school. Based upon both theory and at least some of our site visits, we would have predicted that staff development benefits would have been more strongly associated with process variables such as level of effort and faculty influence. However, staff development outcomes, at least as they are aggregated

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*Each multiple regression analysis was performed using the same set of independent variables, all of which are listed in Table 7-1. Most of these variables were included in the analyses because of high correlations with three or more outcomes; however, superintendent influence and other central staff influence were included for their theoretical importance. Team influence was included in earlier regression analyses, but did not enter the equations.

Table 7-1

STEPWISE REGRESSION (Beta) COEFFICIENTS
FOR RELATIONSHIPS BETWEEN INTERNAL PROCESS VARIABLES
AND SIX SITE-LEVEL OUTCOMES

Internal Process Variable	Site-Level Outcomes					
	Organizational Impacts (n=90)	Product Incorporation (n=90)	Process Incorporation ((n=76)	Problem Solved (n=76)	Scope of Implementation (n=90)	Personal Impacts (n=76)
Level of Effort					.23*	
Quality of Problem-Solving Process	.11*					
Faculty Influence on Process	.11*			.20**		.12*
Principal Influence on Process		.13				
Superintendent Influence on Process				-.20	-.15	
Other Central Staff Influence on Process			-.13*			
Breadth of Involvement in Solution Selection	.24**		.24*		.31**	
Breadth of Involvement in Implementation	.23*	.29**	.20			
Multiple R^2	.38	.15	.20	.15	.16	.05
Adjusted R^2	.34	.12	.15	.11	.12	.02

* $p \leq .05$
** $p \leq .01$

to the school level, are largely a function of the amount of training received by staff members (see Chapter 6). Further analyses were conducted using the individual teacher-level data to compare the personal impacts reported by team members and non-team members--all of whom were targeted users of the product. These investigations showed that, on average, staff members who were on the team during at least three of the four problem-solving stages derived substantially greater personal benefits than those who were not on the team. For example, responses concerning the extent to which they had learned about curriculum development averaged 2.4 for teachers on the team compared with 1.7 for teachers not on the team (the response scale included 0 as the low point and 4 as the high point). Similar results were obtained for other categories of personal benefits, as shown in Figure 7-1. These findings suggest that the problem-solving process can be a source of staff development, but primarily for those who are directly involved in the planning and decision-making activities.

PARTICIPATION AND INFLUENCE IN DECISION MAKING

There are many accounts of the lack of successful planned change in schools. Typically, teachers develop lesson plans, learning objectives, and teaching strategies on their own, with little interaction or influence from other teachers or administrators. Meanwhile, decisions about school-wide change are made by administrators, who then try to impose their decisions on teachers. The RDU approach is different in that it relies upon collaboration between teachers and administrators and the development of consensus about needs and solutions.

A problem-solving team representing both teachers and administrators was formed in four out of five RDU sites, and in the majority of cases these teams exerted a great deal of influence on the problem-solving process. Not surprisingly, however, the influence of individual teachers surpassed that of the team, as shown in Table 7-2. This reflects the strong influence of individual team members during problem identification and especially solution selection, as well as some decentralization of control during planning for implementation. Once solutions were chosen and minimal training given, teachers in many schools were once again left on their own to implement the solutions as they saw fit. In one out of three sites, there was no team at all, or it was functionally nonexistent, by the time the solution was implemented.

In most sites, the faculty as a whole had very little, if any, influence; however, the percentage of cases in which the faculty as a whole had at least some influence (e.g., 43% during problem identification and 38% during solution selection) was higher than in most organized change efforts. Real faculty influence was often cited by local participants as one of the key features distinguishing RDU from more typical innovative activities in their schools. As discussed above and elaborated later in this section, the extent of faculty influence was a strong predictor of successful site outcomes.

There was no clear trend in the influence of principals over decisions in the problem-solving process. On the one hand, a substantial proportion of principals (47% during problem identification, down to 36% during implemen-

FIGURE 7-1
Mean Staff Development Outcomes Reported by Teachers with High and Low Involvement in Local Problem-Solving Terms

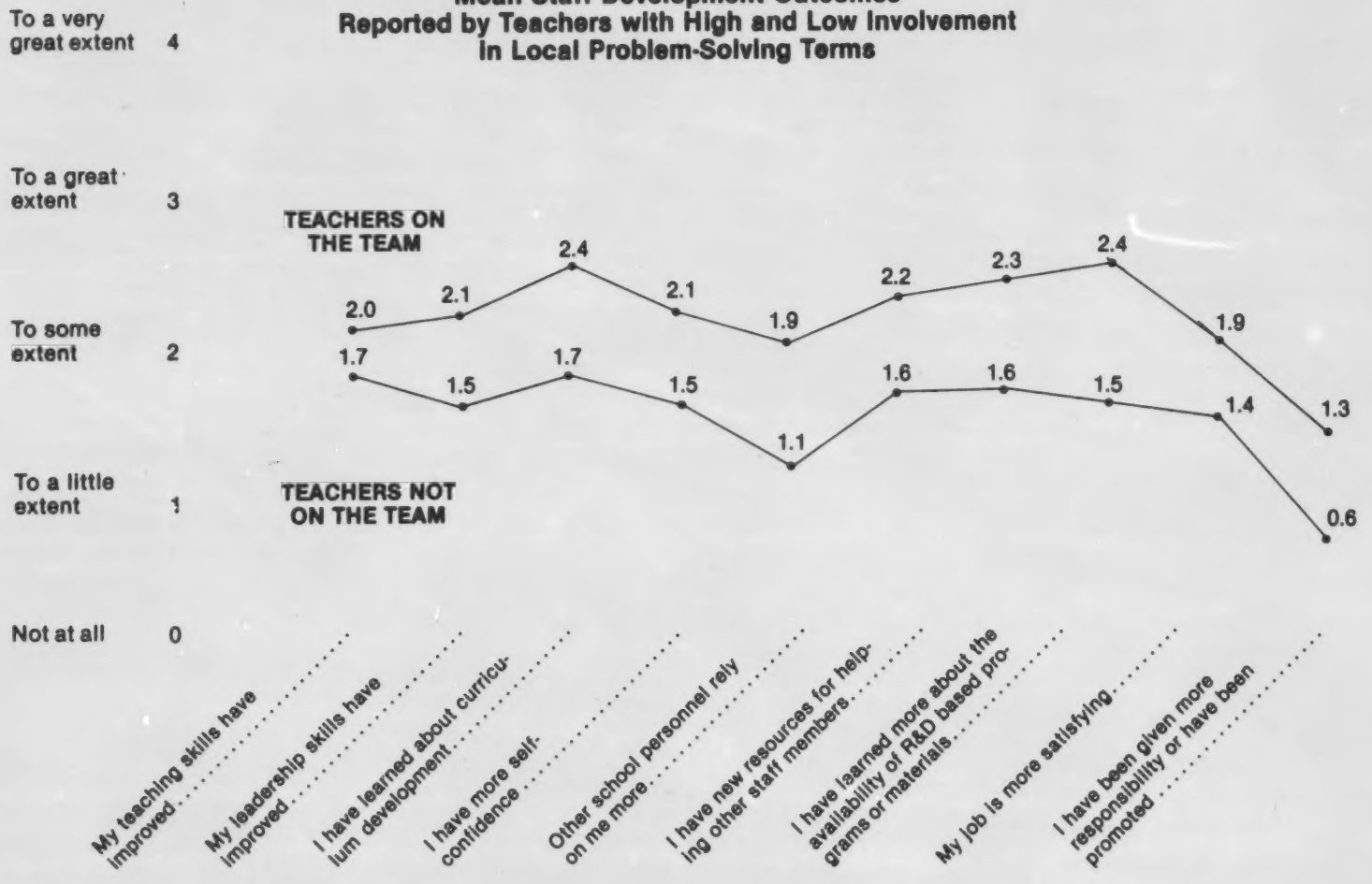

TABLE 7-2

LEVEL OF INFLUENCE OVER MAJOR DECISIONS,
BY ROLE GROUP AND STAGE OF THE PROCESS

Percent of Cases

Level of Influence	Problem Identification	Solution Selection	Planning for Implementation	Implementation
Team				
No team	8	13	17	27
None or very little	10	8	12	12
Some	23	20	22	19
A great deal	60	59	49	42
	100%	100%	100%	100%
	(n=89)	(n=85)	(n=77)	(n=67)
Teacher(s)				
None or very little	17%	9%	9%	6%
Some	27	24	31	35
A great deal	57	67	60	59
	100%	100%	100%	100%
	(n=90)	(n=87)	(n=75)	(n=69)
Faculty as a whole				
None or very little	58%	62%	71%	57%
Some	27	21	23	31
A great deal	16	17	6	13
	100%	100%	100%	100%
	(n=90)	(n=85)	(n=78)	(n=72)
Principal/Asst. Principal				
None or very little	26%	31%	30%	35%
Some	26	27	29	29
A great deal	47	42	41	36
	100%	100%	100%	100%
Superintendent/Asst. Supt.				
None or very little	68%	74%	79%	82%
Some	17	14	10	14
A great deal	15	13	10	4
	100%	100%	100%	100%
	(n=88)	(n=87)	(n=77)	(n=71)
Other central office staff				
None or very little	38%	43%	53%	63%
Some	24	29	15	19
A great deal	38	28	32	19
	100%	100%	100%	100%
	(n=79)	(n=75)	(n=66)	(n=59)

tation) exerted a great deal of influence. On the other hand, there were many principals (26% during problem identification, up to 35% during implementation) who influenced the process hardly at all. The principal's role in the process is discussed further below.

The large majority of superintendents or assistant superintendents (68% during problem identification, increasing to 82% during implementation) had little or no influence over decisions related to the school improvement projects. It should be noted, moreover, that most of the local projects were school-based rather than district-wide. Other central office staff were more likely to take part in the school improvement decisions, though they had less influence than school-based administrators or staff.

Principal influence, teacher influence, and faculty influence are positively related to one another, as well as to team influence, as shown in Table 7-3. However, there is a tendency, though not statistically significant, for the influence of the superintendent and other central office staff to be negatively related to the influence of school-based staff and administrators. This suggests two interpretations: first, that central administrators are more likely to seek involvement in the typical "top-down" model of organized change, rather than supporting change initiated or controlled from below; and, second, that participation by central administrators tends to perpetuate the "top-down" model.

The importance of broad participation in the local problem-solving process has already been noted. The relationship between breadth of involvement and site-level outcomes is strong at each stage of the process, with the exception of problem identification. It should be remembered that breadth of involvement reflects not just the involvement of the faculty and the principal within the implementing school, but also involvement on the part of the superintendent, central office specialists, and other relevant actors. For example, a high score on breadth of involvement in implementation typically represented a district in which the central office took at least some interest in monitoring the implementation process, in providing support, and in spreading the new practice to other schools in the district, but did not dominate the process.

Relationships between each of our measures of site success and the influence of actors in the different role groups by stage of the process are shown in Table 7-4. The influence of an individual teacher, or teachers, is shown to be relatively unimportant, while the influence of the faculty as a whole is very strongly related to site success, especially in terms of organizational impacts. Apparently, it is not enough for teachers to be represented in the decision-making process; rather, the process has to involve the entire faculty, at least during critical decision points.

The most important stages for broad faculty participation, judging from the correlations, are solution selection and ongoing implementation monitoring, evaluation or planning. Based on our site visits, giving the faculty as a whole the chance to participate in selecting the solution not only ensures that the solution will be acceptable to the majority of potential implementors, but also helps increase the faculty's commitment to or sense of ownership of the innovation. Participation of the faculty as a whole in ongoing implementation monitoring, evaluation, or planning helps

Table 7-3

PEARSON CORRELATION COEFFICIENTS
FOR RELATIONSHIPS AMONG THE LEVELS OF INFLUENCE
FOR DIFFERENT ROLE GROUPS

Influence of	Team	Teacher(s)	Faculty as a Whole	Principal/ Asst. Principal	Superintendent/ Asst. Supt.	Other Central Office Staff
Team	.					
Teacher(s)	.59**	.				
Faculty as a Whole	.28**	.34**	.			
Principal/Asst. Principal	.09	.24*	.31**	.		
Superintendent/Asst. Supt.	-.04	-.15	-.20	-.09	.	
Other Central Office Staff	.03	-.14	-.10	-.07	.11	.

* $p \leq .05$
** $p \leq .01$

TABLE 7-4

PEARSON CORRELATION COEFFICIENTS
FOR RELATIONSHIPS BETWEEN SIX SITE-LEVEL OUTCOMES
AND THE LEVELS OF INFLUENCE OF DIFFERENT ROLE GROUPS
BY STAGE OF THE PROCESS

	Site-Level Outcome					
Role Group by Process Stage	Organizational Impacts	Product Incorporation	Process Incorporation	Problem Solved	Scope of Implementation	Personal Impacts
Team						
Problem Identification	.12	.03	.05	.02	-.06	-.03
Solution Selection	.22*	.11	.02	.08	.02	.10
Planning for Impl.	.23*	.25*	.01	.20	.06	.04
Implementation	.13	.09	.09	.00	-.03	-.07
Total	.28*	.17	.05	.11	.07	.03
Teacher(s)						
Problem Identification	.18	.09	.12	.04	-.04	-.01
Solution Selection	.11	-.08	.01	-.02	.04	-.00
Planning for Impl.	.20	.10	.06	-.02	-.01	-.00
Implementation	.13	.21	.02	-.03	.02	.10
Total	.26*	.27*	.14	.09	.10	-.03
Faculty as a Whole						
Problem Identification	.25*	-.01	.09	.19	.02	.12
Solution Selection	.45**	.17	.28*	.37**	.21*	.35**
Planning for Impl.	.35**	.20	.04	.20	.18	.14
Implementation	.48**	.38**	.26*	.35**	.39**	.20
Total	.50**	.30**	.28**	.35**	.22*	.23*
Principal/Asst. Principal						
Problem Identification	.19	-.00	.13	.06	.08	.09
Solution Selection	.39**	.16	.19	.25*	.27**	.10
Planning for Impl.	.35**	.27*	-.03	.24*	.19	.09
Implementation	.40**	.25*	.35**	.21	.21	.13
Superintendent/Asst. Supt.						
Problem Identification	-.04	-.06	-.00	-.12	-.17	.14
Solution Selection	.06	-.03	-.07	-.05	-.01	.06
Planning for Impl.	-.01	-.12	.26*	-.14	-.06	.04
Implementation	.07	-.04	-.09	-.07	-.08	.13
Total	-.05	-.18	.07	-.23**	-.10	-.02
Other Central Office Staff						
Problem Identification	.06	.02	-.10	-.02	.12	.05
Solution Selection	.09	.10	-.19	-.05	.16	.02
Planning for Impl.	.14	.13	-.14	.14	.20	.11
Implementation	.07	.04	-.13	-.12	.09	-.22
Total	.07	.04	-.12	.03	.13	.06

* $p \leq .05$

** $p \leq .01$

to reinforce individual use of the innovation through peer pressure and support, and also helps to minimize ad hoc adaptations at the individual level.

A team is important to the extent that it facilitates breadth of participation and, above all, decision making by the faculty as a whole. In addition, a team effort helps to systematize the problem-solving process, leading to higher levels of problem-solving quality, or rationality, a factor directly related to site success. The correlations between team influence and these other, very important aspects of the internal process are as follows: breadth of involvement in solution selection ($r = .28$, sig. .01); breadth of involvement in planning for implementation ($r = .38$, sig. .01); breadth of involvement in implementation ($r = .34$, sig. .01); influence of the faculty as a whole ($r = .28$, sig. .01); and quality of the problem-solving process ($r = .46$, sig. .01). In other words, team participation in decision making helps to accomplish school improvement objectives by spreading the ownership of decisions (i.e., stake-holding); by eliciting multiple perspectives, insights, and expertise, particularly from those closest to the problem (i.e., teachers); by dampening the effects of a priori assumptions or pet theories of individuals or cliques; and by focusing attention on comparability and coordination across grade levels and classrooms.*

Nevertheless, as shown in Table 7-4, the influence of the team itself is unimportant, except perhaps in relation to our measure of overall organizational change. For this reason, it is important to make a distinction between three types of teams, all of which were present in the RDU program: facilitating teams; decision-making teams; and implementing teams. Some characteristics of these teams are shown in Table 7-5. In some sites, one team served in all three roles; however, in other sites, the roles were divided among two or more teams, or among the team, the faculty, and various individuals.

By our definition, a facilitating team was one that initiated meetings of a larger decision-making group, planned the agendas for these meetings, helped to spark the enthusiasm of the group, structured and facilitated the group process, collected and presented the necessary data for decision making, followed up on details between meetings, sought administrative support and cooperation, and served as the primary contact between the school and external consultants or information resources. In some sites, the facilitating team also screened the initial options for action and wrote the first drafts of problem statements, search requests, and implementation proposals or plans. Facilitating teams were formally organized in some sites, but in most sites the functions of facilitating the group process were assumed informally by several members of a larger group. We viewed these internal facilitators as "internal change agents," or the "internal change agent team." The presence or absence of an "internal change agent" or "internal change agent team" appeared to be an important predictor of success.

*See also Kell and Louis (1980).

Table 7–5
TYPES OF LOCAL ACTION TEAMS

ROLE	Facilitating team	Decision-making team	Implementing Team
FUNCTIONS	Initiate meetings Plan agendas Spark the enthusiasm of participants Structure and facilitate the group process Collect and present information Follow up on details Seek administrative support and cooperation Serve as the primary contact with external consultants and information resources Screen initial options Write first drafts of problem statements, search requests, implementation proposals, and plans Monitor implementation	Review information Brainstorm, discuss, and prioritize options Make final decisions Revise or approve drafts of problem statements, search requests, implementation proposals, and plans Review evaluation results	Participate in training sessions about the solution Develop related materials and activities Participate in adapting the solution to fit the site's needs and context Implement the solution in own classroom Evaluate and provide feedback Recruit and train additional implementers
OPTIMAL SIZE	3 to 5 members	8 to 15 members	Varies depending on the number of implementers
REPRESENTATION	Selection criteria: • leadership ability • commitment to project • flexible time allocation • expectation of remaining in the system Candidates include the principal or assistant principal, central office representatives, and informal opinion leaders on the staff	More teachers/implementers than administrators Representatives of every relevant grade level or department Parents or community members only in some situations	All staff expected to implement in first stage, plus some who are expected to implement at a later date
TRAINING	Orientation to goals and process Special training in: • leadership • problem solving • group process • formative evaluation • finding outside help	Orientation to goals and process	Orientation to goals and process Special training in solution implementation

A decision-making team was one formed for the purpose of reviewing information; brainstorming, discussing and prioritizing options (such as target problems, and solutions); making the final decisions (or deciding on recommendations to the administration); and revising or approving drafts of the problem statements, search requests, and implementation proposals or plans. In some sites, the decision-making body was the faculty as a whole, while in others a smaller, though often representative, body made the decisions.

Finally, an implementing team was simply a trained cadre or nucleus of implementors. The members participated in training sessions about the adopted solution, developed related materials and activities, participated in adapting the solution to fit the site's needs and context, implemented the solution in their own classrooms, evaluated or provided feedback on the solution, and occasionally helped in recruiting and training additional implementors. Although the implementing team may have had considerable influence during planning for implementation, its members frequently had no influence at all during problem identification and solution selection.

Based on our knowledge of the cases, as well as the quantitative findings presented above, it appears that the most consistently successful model for team involvement was one in which a small, three- to five-member group acted as a facilitating team, while the faculty as a whole made the decisions. The second-best model for team involvement was one in which a decision-making team of 8 to 15 members adequately represented all grade levels and factions among the faculty, and established adequate procedures for communicating with the faculty and obtaining faculty feedback (i.e., through regular meetings between team members and constituents, news bulletins, open team meetings, presentations at faculty meetings, and the like).

So far, we have said very little about the role of school administrators in this process, beyond the fact that principal influence did not appear in the regression analyses as a powerful factor in the explanation of site outcomes. In the simple correlations, principal influence is strongly associated with two measures of site success, organizational impacts and program incorporation, and associated to a lesser extent with process incorporation. Thus, the relatively modest explanatory power of principal influence, compared with some other aspects of the internal process, should not be taken as an indication that the school administrator's role is unimportant. Even when decisions are made collectively, leadership is still important, and in many cases the principal is the most appropriate person to provide that leadership. However, a distinction must be made between an administrator who facilitates group decision making and one who dominates the decision-making process or even dictates the decisions. Borrowing from both Thomas (1978) and Leithwood et al. (1978), we identified three types of school administrators: the facilitators; the directors; and the administrators. The facilitative leaders were highly involved in the local problem-solving activities; they used a variety of strategies to involve teachers in decision making, and they relied heavily on teachers to influence other teachers. The directive leaders decided themselves on the nature of needed changes and then tried to get their teachers to follow their decisions. The administrative leaders were essentially passive observers of the problem-solving process;

although they were sometimes authoritarian in matters dealing exclusively with administration, they rarely became actively involved in the group decision-making activities.

In our qualitative analysis of case materials, facilitative leadership was found to be the most consistently effective leadership style. There were also cases in which centralized decision making worked very well. However, the directive leaders who were successful fell somewhere in the "grey area" between directive and facilitative leadership: they were attuned to faculty concerns, had good channels for communication with the faculty, and were trusted and accepted by the faculty as their leader in curriculum and instructional design. The passive administrators were generally ineffective leaders of educational change. The degree of negative impact on the problem-solving process depended on whether the administrator was passively supportive of the process, passively opposed, or completely neutral. Thus, while the principal's active involvement in the process was not always essential, his or her support for the change program appeared to be crucial--particularly at the point of implementation. Teachers seemed to feel that implementation was optional unless the principal backed the change. Moreover, in most schools the principals controlled school resources which would be needed for program incorporation.

In short, the role of effective principals involved several responsibilities which were not necessarily reflected in a strong degree of influence over decision making. First, the most effective principals acted as internal change agents or facilitators, encouraging the staff to become involved in the group problem-solving process, assisting in the collection and presentation of data for decision making, discovering additional resources (either through external change agents or on their own), leading or facilitating team meetings, negotiating special permissions from the central office or obtaining additional district funds, and responding quickly to any problems in implementation. Second, the principals in successful schools provided symbolic leadership. Even if they were not more actively involved, they made it clear that they supported the group problem-solving process and, later, that they supported the innovation itself. This was very important to faculty who were used to looking to the principal for direction, as well as to faculty who had grown mistrustful of the administration's commitment to teacher initiated change. Finally, the principals used their legitimate authority in connection with budgets, schedules, and the supervision of teachers to make sure that the necessary school resources were allocated to the selected programs and that these resources would also be available in the future.*

The role of superintendents and other central office staff is more ambiguous in our analyses. On the one hand, increasing the breadth of involvement to include district administrators sometimes helped to develop a district-level commitment to the innovation, thus facilitating implementation and incorporation of the new program. On the other hand, high levels of influence from upper-level administrators occasionally detracted from the feelings of teachers that they themselves had played a major role in decision making, and thus reduced the teachers' own commitment to the innovation. The

*In several cases, the principal's legitimate authority was used to block, or reverse, changes; this is why it is so important to involve both teachers and administrators in the decision-making process, or at least to make sure that the principal supports the decisions that are being made.

critical issue again appears to be the distinction between facilitative and directive leadership, and between active and passive support. Facilitative leadership from district administrators can be very effective in stimulating change at the school level; in addition, school-level changes often require continuing support from the central office if they are to survive.

OTHER CHARACTERISTICS OF THE PROBLEM-SOLVING PROCESS

As shown in Table 7-6, congruence with our criteria for "sound" group decision-making and "rational" problem-solving practices was found to be "great" or "very great" in over half the cases at each stage of the process. Moreover, as shown in Table 7-7, the rationality of the process is correlated with several of the site-level outcomes. Each stage of the process appears to be important, though the different stages are not always related to the same outcomes.

Sites were most often scored low on problem-solving quality because of a lack of formalization, thoroughness, or objectivity in the problem-solving procedures. This is true for both the "successful" and "unsuccessful" sites.* The difference between the "successful" and "unsuccessful" sites was in the reasonableness of the decisions themselves. For example, the successful and unsuccessful sites were equally likely to not consider alternative definitions of the problem. However, the unsuccessful sites more often failed to adequately specify the problem and more frequently developed a problem statement that was unclear, unmanageable, too narrow (trivial) or too broad (grandiose). Both successful and unsuccessful sites tended not to evaluate solutions according to explicit criteria. However, unsuccessful sites were more often cited for lack of relevance or quality in the chosen product, lack of manageability or cost-effectiveness, and for selecting a solution before the formal search was completed. Finally, the failure to make formal plans or institute adequate controls over implementation occurred with equal frequency in successful and unsuccessful sites. However, unsuccessful sites more often gave insufficient attention to planning for implementation and failed to gain or reinforce administrative support for the solution.

In summary, the degree of formalization of the process was not as important as the appropriateness of the decisions. In many cases, critical school needs were obvious and consensus was reached fairly quickly on an appropriate--though perhaps not the best--course of action. In addition, the amount of thought given to planning for implementation could not always be judged by the existence of a documented plan.

It is important, nonetheless, to be sufficiently deliberate, and to not move so quickly as to sacrifice the quality of the decisions. As shown in Table 7-7, the level of effort devoted to the process has a direct impact

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*The categorical outcome measure described in Chapter 4 was used in classifying sites for this analysis. Those in the "large-scale RDU success" or "mixed-high success" categories were regarded as "successful" sites, while those in the "moderate to low success" or "failure" categories were regarded as "unsuccessful" sites. A count was made of the times each criterion was noted as a reason for lowering a site's rating on problem-solving quality, and then the rank orders of the counts were compared between "successful" and "unsuccessful" sites.

Table 7-6

LEVEL OF EFFORT, GROUP DECISION-MAKING BEHAVIOR, AND PROBLEM-SOLVING BEHAVIOR BY STAGE

	Stage			
	Problem Identification	Solution Selection	Planning for Implementation	Implementation
Level of effort				
Low (less than 10 person-days)	30%	27%	41%	34%
Medium (10-30 person-days)	38	45	34	29
High (over 30 person-days)	33	29	25	37
	100%	100%	100%	100%
	(n=88)	(n=83)	(n=76)	(n=70)
Congruence with group decision-making practices				
To little or no extent	19%	16%	25%	25%
To some extent	24	17	21	19
To a great extent	34	34	28	32
To a very great extent	23	34	26	24
	100%	100%	100%	100%
	(n=86)	(n=77)	(n=68)	(n=63)
Congruence with problem-solving practices				
To little or no extent	16%	20%	18%	15%
To some extent	34	26	29	17
To a great extent	35	38	32	36
To a very great extent	15	16	22	32
	100%	100%	100%	100%
	(n=88)	(n=81)	(n=73)	(n=66)

Table 7-7

PEARSON CORRELATION COEFFICIENTS
FOR RELATIONSHIPS BETWEEN SIX SITE-LEVEL OUTCOMES
AND THREE INTERNAL PROCESS VARIABLES,
BY STAGE OF THE PROCESS

Internal Process Variables by Stage	Site Level Outcomes					
	Organizational Impacts	Product Incorporation	Process Incorporation	Problem Solved	Scope of Implementation	Personal Impacts
Level of effort						
Problem Identification	.16	.12	.05	.06	.13	.03
Solution Selection	.15	.10	.01	.05	.22*	-.05
Planning for Impl.	.32**	.37**	.01	.18	.32**	.09
Implementation	.21	.29*	.06	.10	.28*	.00
Total	.26*	.35**	.12	.14	.27*	-.02
Congruence with group decision-making practices						
Problem Identification	.14	-.01	.05	.07	-.07	.00
Solution Selection	.19	.13	.11	.05	-.08	.07
Planning for Impl.	.19	.17	.08	.14	-.07	.02
Implementation	.27*	.29*	.17	.20	.01	.10
Total	.24*	.17	.08	.09	.07	.07
Congruence with problem-solving practices						
Problem Identification	.33**	.14	.23*	.18	.11	.04
Solution Selection	.41**	.26*	.12	.27*	.14	.05
Planning for Impl.	.36**	.33**	.27*	.27*	.15	.06
Implementation	.30*	.22	.29*	.13	.15	-.00
Total	.40**	.33**	.24*	.27*	.20	.10

* $p \leq .05$
** $p \leq .01$

on outcomes; in addition, it is positively related to problem-solving quality ($r = .45$, sig. .01). It is also related to breadth of involvement, since the more people who are involved the higher the level of effort for each activity (for example, $r = .48$, sig. .01, for the relationship between level of effort and breadth of involvement in planning for implementation). To achieve very broad and significant changes, it may be necessary to devote considerable effort to the process--as many as 30 or more person-days per year. In most cases, this would allow for weekly meetings of about one hour, or monthly meetings of several hours or more.

While not over-simplifying the process, team momentum must be maintained. It is important not to allow the process to drag on too long, with long periods of inactivity between meetings. Teachers appeared to be most satisfied with the process when no more than one school year--or even less--was spent in analyzing problems and selecting a solution. Major steps toward implementation could then take place during the following year, while enthusiasm was still strong.

SUMMARY

The analysis presented above has produced a number of findings that may have some significance for both theory and practice. Perhaps the most important overall finding is that, by themselves, variables describing the internal problem-solving process and the roles of various key actors in that process are of limited value in explaining RDU outcomes, as compared to product characteristics or external technical assistance. The one exception to this generalization is equally important: process variables are of key importance in explaining the degree to which there is a change in organizational capacity, as measured by our overall organizational impacts outcome. In particular, the findings suggest that broad participation in both the adoption/selection of a new program, and in implementation decisions, is crucial to achieving broad organizational development outcomes.

A summary of some of the additional positive, practical findings that can be derived from the discussion in this chapter include:

- Participating in a team-based problem-solving process can produce significant staff development benefits for individual teachers. Encouraging meaningful participation may be a sound strategy for school-based staff development, producing not only individual growth, but also improved classroom practice and materials.

- Participation in decision making by teachers does not necessarily reduce the influence of principals. In fact, principal and teacher influence tend to occur together. This suggests that principals should recognize that effective sharing of decision making with their staff members may augment rather than diminish their ability to shape the curriculum and classroom practices in the school.

- Faculty participation does not have to occur at all stages in the problem-solving process in order to increase school improvement outcomes. The most important stages at which faculty involvement should be stimulated are in adoption of new programs, and in the monitoring and assessment of implementation.

- Having a well-organized decision-making team will not necessarily produce beneficial school improvement outcomes. However, an active facilitating team which acts as an internal change agent for a school improvement effort, can be very effective as long as there is also a high level of involvement by the overall faculty.

- While attention to the quality of the problem-solving process was important (particularly in achieving broad organizational impacts), the actual activities engaged in were somewhat less important than the soundness of the decisions that were reached. Many non-formalized or ad hoc practices led to sound decisions, while elaborate problem-solving activities sometimes covered up inappropriate allocations of resources and poor decisions. Thus, the emphasis on the quality of the process and the movement toward school improvement objectives must be well balanced.

- Central office and superintendent influence on school-based problem solving tend to have negative impacts, and undermine important faculty participation. The reasons for this are not fully explicated in our data, but it seems that the perceived disjuncture between "top-down" and "bottom-up" approaches to change focuses on the organizational boundaries between school and district, and not those between principal and teacher.

CHAPTER 8

THE IMPACT OF "NON-PROGRAM" FEATURES

INTRODUCTION

The previous chapters have demonstrated that the intervention strategies employed by the R&D Utilization program were effective in producing both program goals and unintended school improvement outcomes. Characteristics of the externally developed products and the external human assistance and training were particularly important in achieving these outcomes. Features of the internal problem-solving process were important as well.

Although the RDU program involved a rather heavy level of effort on the part of local school personnel, it was in large measure an external intervention. There is an accumulating literature, however, that suggests that local site characteristics can be strong determinants of and/or impediments to any school improvement effort, particularly those that employ external intervention strategies (Peterson, 1977; Derr, 1976; Weick, 1976). Some say that whether or not innovations get implemented is not a rational, predictable process, but is conditioned by critical events, "politics," and other features of the local context (Corwin, 1973; March and Olsen, 1974; Hage and Aiken, 1970). Organizational characteristics can overwhelm the external intervention: the local culture, structure and characteristics of staff and pupils are the major determinants of innovative behavior (Rosenblum and Louis, 1981; Herriott and Hodgkins, 1973; Zaltman et al., 1977). Thus, the most innovative schools and teachers are the natural "knowledge users," and the result is that good schools and classrooms continue to improve, while those that may be more in need of change fail to move toward new practices and ideas. Lack of experience and incentives for knowledge utilization in many school settings may result in increasing discrepancies between the best public schools and those that are currently unable to provide children with a high quality educational experience.

In order to understand whether the RDU intervention strategies were really potent predictors of the school improvement outcomes that were evident in the participating local school sites, it is important to explore an alternative explanation--the predictive power of local characteristics on those outcomes--and to compare the importance of local effects with those of the intervention strategies. The purpose of this chapter is to begin that exploration. The following questions are addressed:

- What was the impact of local site characteristics on the school improvement outcomes?*
- Who benefited from the RDU experience? In particular, how successful was the RDU program in addressing issues of educational equity?

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*The relative impact of the intervention as compared to the site characteristics is discussed in the following chapter.

THE IMPORTANCE OF LOCAL CHARACTERISTICS

There are many organizational features and forces that can promote or inhibit a rational change process. Some of these are forces within the organization's environment which it cannot control, such as community turbulence, SES, and demography. Others are features of the organization itself such as the characteristics of the student population and staff, the organization's size, and its structure and climate. Although all of these factors are relatively "non-manipulable," some of the local features are more subject to control than others.

While many theorists have emphasized the importance of the effects of a system's characteristics on change, primacy may be given to different categories of organizational characteristics in explaining change. (For an extensive discussion of these approaches, see Rosenblum and Louis, 1981.) Some emphasize the importance of the school climate and the school staff (Likert, 1967; Katz and Kahn, 1966). Among these are some who emphasize the importance of cultural barriers to change (Sarason, 1971) and the relationship between "felt control" of participants and degree of innovativeness (Zaltman, 1974). Others take a more structural approach suggesting that the complexity, authority structure and formalization in an organization are predictors of change (Hage and Aiken, 1970). These are often viewed as constraints on innovative behavior (Blau and Schoenherr, 1971), suggesting that organizations function best when there is enough delegation of responsibility to accommodate the adaptation of broadly based organizational goals to local situations (Havelock, 1971; Thompson, 1967).

Some forces precipitate change; others may be sources of resistance to change, although resistance to change may sometimes be healthy--such as when the proposed innovations may not meet the real needs of the local context (Zaltman and Duncan, 1977). Past innovativeness is often viewed as an important precursor to further change, due for example, to the cumulatively increasing pressure on "non-adopters" to adopt (Rogers and Shoemaker, 1961). This approach goes hand in hand with the view that the characteristics of the school staff are the important predictors of the change process (Corwin, 1973). The ways in which the environmental factors influence the change process have been variably assessed. The environment has been viewed, on the one hand, as the direct force for change (Bowles and Gintis, 1972) and the changes are seen as a result of effective response to changing environmental inputs (Baldridge, 1974). On the other hand, environment has been viewed as a constraint on change (Herriott and Hodgkins, 1973; Ottinger and Marks, 1974).

While theorists do often assign primacy to particular organizational features, many, if not most, agree that there are multiple characteristics that affect change in education (e.g., Rosenblum and Louis, 1981; Zaltman et al., 1977). It is important to consider the organizational context from the following viewpoints: the organizational environment, climate, structure and influence system; characteristics of individuals involved; and the nature of the intended changes.

VARIABLES AND MEASURES

Data on the characteristics of the schools and communities involved in the RDU program were derived largely from questions on the surveys of principals and teachers. In addition, information from site visits and case materials provided by the projects were used to categorize the nature of the intended changes (i.e., the focus of the "problem" addressed by RDU), prior innovativeness, and the level of community turbulence. These were coded by members of the study team, using the consolidated coding form described in Chapter 3.

In keeping with the assumption that a variety of categories of site characteristics may be related to the innovative process, variables were measured in the following five categories:

Characteristics of the community setting: Variables included an index of disadvantagement of pupils (based on percent of students one or more grades below grade level, percent qualifying for free or reduced cost lunch and percent minority), percent of students from white collar families, an index of recent changes in the community (including shifts in population and socio-economic changes), and demographic nature of the surrounding community (large city, small city, suburban or rural).

Principal characteristics: The principal variables included the length of time the principal had been in the school, the number of years of teaching experience and prior administrative experience, membership in professional organizations, and the degree to which the staff rated him/her as an instructional leader.

Characteristics of the teaching staff: These variables included information provided by principals on the following characteristics of the building staff--percent of teachers who were new to the school and percent who had been teaching for ten years or more, percent of teachers who were male, the percent with advanced degrees, and teacher reports on the number of professional organizations in which they were members.

District and school size, structure and climate: Variables included number of schools in the district, number of pupils in the school, school complexity, school level, the influence of teachers, principals and the superintendent over key educational decisions,* staff orientation to change,

*Principals were asked to rate the degree of influence of superintendent, principal, and teachers (using a 0-3 scale) on the 11 types of educational decisions, including curriculum decisions, classroom activities, hiring decisions, identifying and implementing school-wide changes. See Appendix B.

collegiality, level of tension among staff,* and previous experience with similar problem-solving activities.**

Nature of the problem being addressed by the RDU intervention: Variables included a measure of the magnitude of the problem (centrality and severity) and whether the problem focus was on pupil performance, the curriculum and materials, classroom organization, school organization, teaching effectiveness, pupil attitudes and behaviors and role relationships within the school or between the school and central office or community.***

The incidence of "critical events" that occurred in the schools and districts (such as strikes, the failure of a bond issue, or turnover in key positions during the RDU experience) were not systematically measured or coded in the consolidated coding form. However, since such events featured in several of the case studies and site reports, a separate analysis of the apparent impact of critical events on a subset of sites was conducted. The results of this analysis are described later in this chapter.

OVERVIEW OF THE CHARACTERISTICS OF THE RDU SCHOOLS

Before discussing the degree to which local site characteristics were related to the school improvement outcomes, and before describing similarities and differences between the "most successful" and "least successful" schools, we present a brief overview of the kinds of schools that participated in the program. In general, they represented a broad range of school characteristics. About 55% of the schools were elementary, 20% were middle or junior high schools, and about 16% were senior high schools. (The remainder were special schools or not classifiable within one of these three categories.) There were few "big city" schools (under 2%). About 25% were in suburbs or medium-sized cities. Well over 60% were in small cities or towns, or rural, with the large majority of these in rural areas.

The schools and districts varied in size. The average school was in a district with 13 schools, although the range was from a district with

*Teachers were asked to rate a variety of statements (on a four-point scale from definitely false to definitely true) reflecting orientation to change, collegiality, tensions, and the degree to which the principal was viewed as an instructional leader. Responses to items within each category were summed to create a scale representing each of the variables. See Appendix B.

**Two variables were constructed based on a number of items recorded on the consolidated coding form from site visit and site case materials. One scale represented the degree to which the site had favorable precedents for change. The second reflected the degree to which the site had engaged in steps of the RDU problem-solving process prior to the site's entry into the program.

***These ratings were based on the judgement of the core staff member coding the "problem characteristics" from site visit and case materials data and from site reports prepared for the RDU projects.

one school (with two teachers and 71 pupils) to one with 79 schools. The average number of pupils in a school was 588, although at least one school had close to 3000 pupils. Most schools had relatively enduring, stable, and mature staff. The average teacher had 19 years of teaching experience, and the average school had over 40% of teachers with ten years or more experience. About 7% of the teachers were new to their schools, although the range was from 0 to 38%. Many also had masters degrees (on average, 30% of the teachers in each school). About 28% of the teachers were male, most being in secondary schools.

Principals had been in their schools from 1 to 27 years, with the average being 7. Most had had prior teaching and/or administrative experience. The average principal held membership in three professional organizations. Only 2% reported no professional organizational affiliation.

The percent minority in the schools ranged from 0 to 98% with the average being 14%. (Schools with high percentages of minority populations were largely in two of the seven RDU projects.) The percent of students one or more grades behind their grade level ranged from 0 to 80% (the average being 24%).

Many schools had little or no precedent for being involved in an innovative program. Thirty-five percent had not been involved in federal or state-funded school improvement programs other than Title I. More than half had no precedent for forming a local problem-solving team. About 20% of the schools seemed to have a favorable precedent with some aspect of the RDU experience; very few (under 5%) seemed to have experienced unfavorable precedents. Thus, overall, a review of the background and prior history of the RDU schools suggests that as a group, they were not necessarily "predestined" for success.

The RDU schools became involved in the RDU program in a variety of ways. The recruitment process varied not only across projects but within projects as well.* In some cases a principal or inservice committee actively volunteered, as in the case of a principal who asked to participate when she heard the proposal was being submitted during a Teacher Education Center meeting (in the Florida project). In other cases, school personnel were looking for resources to support ongoing inservice programs or to deal with pressing problems and "stumbled" upon the RDU project in their search. Sometimes field agents recruited sites, either because they had previously worked with the site in other issues, or because they heard that a site might be receptive to assistance, having already conducted a needs assessment.

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*During preliminary site visits conducted in the first year of the study (the second year of the program) attempts were made to ascertain information on how sites were selected or became involved in the program. In many cases, respondents did not know or disagreed on the actual recruitment or selection process and we were unable to construct a valid or reliable variable for this topic. This section is based on information we were able to gather during visits with sites or project headquarters.

In the largest number of sites, it appears that the schools were "volunteered" by top-level district administration, largely because of poor performance on standardized tests. In a few sites, however, the faculty were given the opportunity to vote on whether they were willing to participate.

There is no clear evidence that the most successful sites were those which volunteered or were most anxious to participate from the beginning. What the evidence suggests is that schools don't have to be consciously and deliberately looking for help in order to take advantage of it when it comes.

IMPACTS OF LOCAL SITE CHARACTERISTICS ON OUTCOMES

A first step in the analysis of local site characteristics was to examine separately the relationship of each category of site characteristic variables to the school improvement outcomes. The results of regressions of outcomes on each of these categories separately had little or no explanatory power. For both characteristics of the community setting and principal characteristics, there were no regressions that explained as much as 15% of the variance in any dependent variable.*

Even on the basis of simple correlations, few demographic characteristics seemed to make any difference (see Table 8-1). In other words, size or type of community (such as degree of rurality, for example), the degree to which there had been recent community change or turbulence, and the socioeconomic status of the community did not discriminate. The only outcome which was significantly correlated with rurality was personal impacts on staff ($r = .19$).

"Readiness," in terms of favorable precedents for change, was also not an important factor. The only readiness variable that did correlate was the one that measured the degree to which prior steps had been taken to identify and begin to deal with the problem that was a focus of the RDU intervention. It appears that if the problem-solving momentum had already begun, there was a greater chance that the RDU intervention would achieve a variety of impacts. Thus "pre-RDU" activity was significantly correlated with scope of implementation ($r = .23$), with both process incorporation ($r = .24$) and program incorporation ($r = .28$) and with other organizational changes ($r = .25$).

The size of the school did not matter either, although there was a tendency for schools in more complex districts to achieve more program incorporation ($r = .15$) and widespread organizational changes ($r = .20$). Nor was there any evidence that school level was related to program impacts. Contrary to a popular assumption that elementary schools are more likely to benefit from a school improvement program than secondary schools, there were no significant correlations between school level and any of the outcome variables.

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*Because of the large number of theoretically and practically insignificant regressions, we have chosen to present only tables where the unadjusted Multiple R^2 is greater than .15.

Table 8-1

PEARSON CORRELATION COEFFICIENTS BETWEEN LOCAL SITE CHARACTERISTICS AND OUTCOMES

Local Site Characteristics	Outcomes					
	Organizational Impacts	Product Incorporation	Process Incorporation	Problem Solved	Scope of Implementation	Personal Impacts
Rurality	-.06	.03	.08	.05	.07	.19*
Level of Community Change	.11	.07	-.00	.04	.06	.05
Number of Schools in District	.20**	.15*	.14	.07	.14	.09
Complexity of District	-.05	-.01	.00	-.00	.03	-.03
Index of Pupil Disadvantagement	.09	.09	-.02	.18*	.27**	.08
SES	-.06	.06	.08	-.08	-.01	-.10
Student Percent Minority	.15	.14	.10	.13	.26**	.05
School Level	-.12	-.11	.65	-.14	-.06	-.06
Number of Pupils in School	-.02	.04	-.07	-.04	.07	.00
Precedents for Change	-.02	.09	.08	.00	-.01	.05
Prior Problem-Solving Activities	.25**	.28**	.24*	.18	.23**	.02
Principal Length of Time in School	-.01	.09	.06	.03	.01	-.16*
Principal Teaching Experience	.04	.14	.07	-.04	.29**	-.11
Principal Administrative Experience	.04	.11	.06	-.02	.07	-.21**
Principal Professional Membership	-.03	-.03	.01	-.03	-.00	-.01
Principal/Instructional Leader	.25**	.08	.09	.15*	.06	.13
% Male Staff	-.29**	-.27**	-.06	-.17*	-.23**	-.20**
Teacher Professional Membership	-.15*	-.10	-.04	-.00	.03	-.03
Teacher Influence in Decision Making	.23**	.21**	.29**	.11	.08	-.03
Princ. Influence in Decision Making	.28**	.09	.15	.15	.03	.01
Supt. Influence in Decision Making	-.17	-.15	-.06	-.13	-.05	.06
Teacher Orientation to Change	.30**	.13	.19**	.20**	.08	.18**
Collegiality	.18**	-.07	.03	.00	-.07	-.07
Level of Tension	-.25**	-.02	-.09	-.02	.03	-.17
Magnitude of Problem	.19	.05	.20	.25*	.09	.08
Problem in Pupil Performance	.30**	.26**	-.22*	.36**	.38**	-.01
Problem in Pupil Attitudes and Behavior	-.01	-.12	.10	-.02	-.06	-.02
Problem in Curriculum and Materials	.19	.24*	-.07	.24*	.29**	.28**
Problem in Classroom Organization	.42**	.28**	.02	.28**	.21*	.31**
Problem in School Organization	.14	.12	.01	-.01	.13	.10
Problem in Role Relationships	-.14*	-.04	-.09	-.05	-.13	-.16*

* $p \leq .05$

** $p \leq .01$

The background and experience of the principals in the RDU schools had little or no significant influence on the outcomes of the effort. It didn't much matter if the principals were new to the school, or whether they had had much teaching or administrative experience. The only outcome that was significantly correlated with principal experience and tenure was personal impacts on staff. However, as is noted below, the role of the principal in the structure and climate of the school was very important. For example, the degree to which the principal was perceived by his/her staff to be an instructional leader was significantly correlated with widespread organizational changes (r= .28) and with the degree to which the problem was perceived as solved (r= .15).

In a regression of outcomes on characteristics of the teaching staff, only the percentage of staff who were male contributed significantly to the explanation of overall organizational impacts. It is interesting to note that this relationship was a negative one, suggesting that male teachers, who were also more typically in secondary schools (r= .80), may be more "independent" and resistant to an external intervention and the kinds of collaborative efforts that were a feature of the RDU program. Simple correlations show that the percentage of staff who were male was significantly negatively correlated with all outcomes except process incorporation (with which it had no significant relationship). Many of these men, particularly in the rural communities which were so prevalent among the RDU sites, may have held second jobs, or had coaching responsibilities in the school, thereby also making them less available and possibly less willing to spend the time necessary on RDU.

More important to the explanation of school outcomes were the characteristics of the structure and climate of the schools and the nature of the problem that was being addressed by the RDU program at the local site. Four structure and climate variables did explain 15% of the variance in one outcome--overall organizational impact. Among these are teacher change orientation, principal influence over decision making, and teacher influence over decision making (Table 8-2). Although the regressions of other outcomes on structure and climate variables had little or no significant explanatory power, many of these individual variables were significantly correlated with several outcomes. In particular, teacher orientation to change was positively and significantly correlated not only with organizational changes (r= .30), but also with process incorporation (r= .19), personal impacts (r= .18) and with the degree to which the problem was perceived as solved (r= .20). Likewise, teacher influence in decision making was correlated not only with organizational impacts (r= .23), but also with product incorporation (r= .21) and process incorporation (r= .29).

The evidence suggests that the success of a program like RDU may be heavily influenced by teacher attitudes and by roles played by teachers in the ongoing relationships in a school. Much of the internal problem-solving activities described in Chapter 7 involve the commitment and involvement of school staff. It appears quite likely that if such commitment and involvement are already in place in a school, the desired program outcomes, as well as spin-off effects, are more likely to be achieved. It is interesting to note that organizational impact is also significantly correlated with collegiality among staff (r= .18) and with (low) level of tension (r= -.25). The degree to which membership in teacher professional organizations is

Table 8-2

STANDARDIZED STEPWISE REGRESSION (BETA)+ COEFFICIENTS FOR THE RELATIONSHIP BETWEEN SCHOOL STRUCTURE AND CLIMATE VARIABLES, AND ORGANIZATIONAL IMPACTS++ (N=116)

Structure and Climate Variables	Organizational Impacts
Teacher Change Orientation	.34**
Teacher Influence in Decision Making	.15
Principal Influence in Decision Making	.20*
Principal Viewed as Instructional Leader	-.15
Collegiality	
Level of Tension	
Multiple R^2	.17
Adjusted Multiple R^2	.15

+ Beta Coefficients are presented only for those variables which contributed to the reported multiple R^2. The selection process was stopped when additional variables failed to increase the multiple R^2 by 1% or more; the order of entry was unforced.

++ Data are presented only for the outcome measure for which structure and climate variables explained at least 15% of the variance after the selection process was stopped.

* $p. \geq .05$

** $p. \geq .01$

related to organizational change, on the other hand, is negative (r=- .15). These professional associations tended to be bargaining units, and in small, relatively rural schools (i.e., those which were most representative of the RDU schools), teachers who were members of the teachers' associations were among the more "militant" and probably more resistant to the extra demands placed on them in connection with RDU activities. Principal professional membership (in organizations which were not likely to be bargaining units) was not significantly correlated with any outcome measures.

The category of site variables that had the most explanatory power in regression analyses was the problem focus, i.e., the characteristics of the problem that the sites dealt with in the RDU program. Three outcomes (organizational impacts, staff impacts, and the degree to which the problem was solved) had at least 15% of the variance explained by characteristics of the problem (Table 8-3). The most important of these were a focus on classroom organization, and/or a focus on pupil performance. Not only were these variables predictors in the regression analyses, but they were also highly correlated with many of the outcomes. For example, focusing on problems of pupil performance was positively significantly correlated with organizational impacts (r= .30), product incorporation (r= .26), scope of implementation (r= .38) and the degree to which the problem was perceived as solved (r= .36). Similarly, a focus on classroom organization problems was significantly correlated with all outcomes except process incorporation, and was especially correlated with organizational impact (r= .42). On the other hand, the focus on problems involving "relationships" (i.e., problems of relationships among staff, between staff and administration, between school and central office or community) was negatively related to outcomes, and a focus on problems of pupil attitudes or behavior was unrelated to outcomes. The implication of this finding is that the RDU intervention was most useful in dealing with the more concrete, classroom-oriented and perhaps more "tangible" problems. In part this may be due to the nature of the product base that was a feature of most of the RDU projects. These were largely curriculum products and/or those dealing with reading or math management systems--in other words, products largely relevant to sites dealing with achievement or classroom management problems. If schools chose to deal with problems of a more affective nature, they were less likely to find suitable solutions in the RDU projects' knowledge bases, and were less likely to achieve corollary spin-off outcomes as well.

It is interesting to note that dealing with a pupil performance problem was negatively correlated with process incorporation (r= -.22), and focus on classroom organization was unrelated to process incorporation. This suggests that attention to successfully solving a concrete classroom-oriented problem may also result in other impacts (as, for example, organizational and staff development impacts), but may be least compatible in the short term with achieving greater capacity for RDU-like problem solving that would be indicated by process incorporation.

In summary, site characteristics, when examined in separate categories, proved to have weak explanatory power, with the exception of problem characteristics and to a lesser degree the characteristics of the structure and climate of the school.

Table 8-3

STANDARDIZED STEPWISE REGRESSION (BETA)[+] COEFFICIENTS
FOR THE RELATIONSHIP BETWEEN CHARACTERISTICS OF THE PROBLEM
AND THREE MEASURES OF SCHOOL OUTCOMES[++]

	School Outcome		
Problem Characteristics	Organizational Impacts	Problem Solved	Personal Impacts (N=77)
Magnitude of the Problem	.08	.11	
Problem in Pupil Performance	.21*	.33**	
Problem in Classroom Organization	.38**	.26*	.24**
Problem in Relationships	-.11		-.12
Problem in Curriculum Materials			.21**
Problem in Pupil Attitudes and Behavior			
Multiple R^2	.28	.22	.18
Adjusted Multiple R^2	.24	.19	.15

+ Beta Coefficients are presently only for those variables which contributed to the reported multiple R^2. The selection process was stopped when additional variables failed to increase the multiple R^2 by 1% or more; the order of entry was unforced.

++ Data are presented only for the outcome measure for which problem characteristics explained at least 15% of the variance after the selection process was stopped.

* $p \leq .05$

** $p \leq .01$

However, one further step was taken, which was to examine the combined effect on school impacts of the most potent site characteristic variables from several categories (based on simple correlations as well as on the regression analyses). For this analysis the following variables were chosen: teacher orientation to change; teacher influence over decision making; the index of disadvantagement of students; school level; percent male staff; the degree to which the problem-solving activities had begun prior to the RDU program (an index of "readiness"); and the identification of the problem as being one of classroom organization or pupil performance. As Table 8-4 shows, these variables do explain a relatively high percentage of variance on many of the outcomes, particularly product incorporation (R^2= .45) and organizational impacts (R^2= .40). Personal impacts are explained the least by site characteristics (R^2= .16).

Two variables stand out as entering into the equations for five of the six outcomes in these analyses: prior problem-solving activities and focusing on a problem of pupil performance. Problems in pupil performance were especially highly predictive of scope of implementation, product incorporation and the degree to which the problem was solved. Once again, however, it was negatively related to process incorporation. Teacher influence in decision making, on the other hand, was highly predictive of both product and process incorporation, as was (although to a lesser degree) the indicator of readiness. The most powerful predictor of organizational impact was teacher orientation to change. The most heartening implication of these findings is that, unlike the demographic characteristics which were not discriminating variables, from the perspective of outcomes, the predictive categories are the most "manipulable" of the site characteristics, and therefore amenable to intervention strategies.

One category of local site conditions which had variable effects and which has not been discussed yet in this chapter is "critical events." It is to this issue which we now turn.

THE IMPACT OF CRITICAL EVENTS

Events such as school strikes, abrupt changes in a school's financial condition, or turnover among key personnel happened frequently enough in the sites we visited that we began to see them as potentially important factors in the explanation of site outcomes, perhaps even more important than factors over which there is more control. To explore this idea more systematically, we reviewed the summary analyses of each site prepared by the senior researchers involved in the consolidated coding process. (These analyses included, among other information, the coders' perceptions of the key factors which either facilitated or impeded success at each site.) We also reviewed the complete set of field notes from each of our follow-up site visits, conducted in the Winter and Spring of 1979. On the basis of this review, tables were constructed which recorded the occurrence of each type of event, the influence of the event on the site's activities (whether positive, negative, or neutral/unknown), and the classification of the site according to the categorical measure of site success which was described in Chapter 4 (large-scale success, mixed high success, RDU success, spin-off success, moderate to low success, and failure).

Table 8-4

STANDARDIZED STEPWISE REGRESSION (BETA)+ COEFFICIENTS
FOR THE RELATIONSHIP BETWEEN SCHOOL CHARACTERISTICS AND
SIX MEASURES OF SCHOOL OUTCOMES
(N=43)

School Characteristics	School Outcomes					
	Organizational Impacts	Product Incorporation	Process Incorporation	Problem Solved	Scope of Implementation	Personal Impacts
School Level						.23
Index of Disadvantagement						.20
Teacher Influence in Decision Making		.39**	.34**			
Teacher Change Orientation	.52**			.28*		
% Male Teachers	-.28*					
Prior Problem-Solving Activities	.21	.21*	.29*	.16	.23	
Problem in Pupil Performance	.30*	.47**	-.31*	.47**	.40**	
Problem in Classroom Organization				.27*	.39**	
Multiple R^2	.42	.50	.31	.40	.40	.24
Adjusted Multiple R^2	.40	.45	.24	.34	.34	.16

+ Beta Coefficients are presently only for those variables which contributed to the reported multiple R^2. The selection process was stopped when additional variables failed to increase the Multiple R^2 by 1% or more; the order of entry was unforced.

* p. $\leq$ .05

** p. $\leq$ .01

The results confirm that critical events (events which have the potential for disrupting or altering local problem-solving activities or their outcomes) are not uncommon. In fact, they happen so frequently that they may be viewed as "normal" occurrences in schools, even though they are generally unpredictable at the outset of a project. A critical event does not, however, invariably signal a crisis, or turning point, in project activities, as we explain further below.

Roughly half of the 90 sites examined encountered one or more of the following events during the two to three years covered by our data (the number of sites is given in parentheses following each event):*

- Teacher/implementor turnover (15)
- Turnover in superintendent or key central office staff (12)
- Principal turnover (11)
- Change in financial conditions, usually for the worse (11)
- Field agent turnover (9)
- Team leader turnover (7)
- Teachers' strike or other job action (5)
- Reorganization of schools (5)
- Change in district policies or priorities (4)
- Reductions in force (4)
- Crisis in parent/school relations (2)
- Judicial intervention in the school system (2)
- Severe storm (1)

Over a third of the sites experienced turnover in local personnel--either a high rate of turnover among implementing staff or at least one changeover in principal, team leader, superintendent, or a key central office staff member. The turnover was almost always seen as having a negative effect on the local project activities; this was also true of most other kinds of critical events.

Turnover among the implementing staff meant that new staff had to be oriented to the project and given training in use of the innovation.

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*Note that the real incidence of these events is probably even higher, since the data which were examined presumably mention only events that were perceived by our research staff to affect the project.

New staff often received less training, or less formal training, than the original implementors. Many schools relied on over-the-shoulder or informal training by other staff members, rather than on bringing back the product developers or other outside consultants to conduct formal training sessions. New staff were therefore less likely to have an adequate understanding of the innovation. In addition, because they had not participated in selecting the innovation or planning its use, new staff often were not as committed to the innovation as staff who had been involved in the decision making. If they were given any choice, new staff were less likely to use the innovation than the original implementors. The sites which coped successfully with turnover in the implementing staff were those in which the expectation for schoolwide adoption of the innovation was very clear, and in which training mechanisms, either formal or informal, were firmly established.

Principal turnover seemed to have its greatest negative impact on incorporation of the new problem-solving procedures--although some new principals were also less supportive of the curricular innovation. Basically, most principals had their own leadership styles to which they were accustomed. In cases where the new principals were already inclined to be facilitators, they welcomed the fact that staff had been trained in participatory problem-solving techniques. However, where the new principals were inclined to be authoritarian or directive, the staff's experience in participatory decision making was unlikely to influence a change in their decision-making style. There was at least one exception: at one site the staff insisted that the new principal continue the participatory process for future decisions.

Curricular innovations were seldom killed outright by the new principals, though they sometimes died for lack of strong principal support. New principals, like new teachers, were seldom deeply committed to the innovations of their predecessors. Again, there were exceptions: in two sites, the active enthusiasm of a new principal stimulated the use of an innovation which had been given only lukewarm, or passive, support by the previous administrator.

In cases where there was turnover in the "internal change agent" (who could be a teacher, a district staff member, or a principal), the implementing staff tended to lose interest in the innovation. Even where the internal change agent was replaced by someone just as capable and just as committed to the innovation, there was usually a temporary setback due to the discontinuity in leadership. In certain situations, however, turnover in the formal team was beneficial: in one site, a reading specialist hired from outside the school district to coordinate program implementation was disliked by key staff members; the program was not really successful until after the coordinator moved on to another job and was replaced by a member of the original staff.

A change in district financial conditions can affect incorporation of an innovation in several ways. For example, in several cases the districts were unable to come up with the funds needed for replacement of consumable materials. In one district, where there were staff cutbacks, the remaining staff had heavier workloads and didn't feel that they could devote the extra time to the innovation. In nearly all the districts where there

were budget cutbacks, the worsening financial conditions eroded staff morale and motivation so that it was more difficult to maintain staff enthusiasm for changes which required extra work.

While a teachers' strike was a serious setback in several sites (due to the time lost and negative impacts on teacher morale), in two sites the strikes led to even greater commitment to the innovation. The strikes reportedly resulted in greater cohesiveness and collegiality among the staff, as well as in a greater need among teachers to demonstrate their professionalism. Moreover, in one of these cases, the staff apparently regarded the hard work that went into learning to use the innovation as "occupational therapy" to help them forget the unpleasantness of the strike.

School reorganization, including changes in attendance areas, consolidation, or changes in grade levels, had mostly indirect, although profound, impacts on project activities. For example, one elementary school dropped out of the RDU program when a shift in attendance areas caused a dramatic decline in the number of children performing below grade level. In another district, the site school was converted from a junior high school into an elementary school; the field agent tried to continue the project activities in the school to which most of the site's teachers had been transferred, but this was really like starting all over again, since she was working with a new principal, a new reading coordinator, and a staff which was, on the whole, quite different. In another district, attention was diverted from the project by the need to plan for the inclusion of ninth grade classes at the high school.

A shift in district policies or priorities can also affect the amount of time and attention devoted to the project. For example, if a new basic skills curriculum is adopted soon after supplemental career education materials are purchased, teachers tend to ignore the supplemental materials until they have become comfortable with the new curriculum. New district policies may also be in direct conflict with a recent innovation. For example, in one site the district adopted a very strict pupil progression plan which conflicted with the ungraded, continuous progress approach recently adopted in the site school.

While this has been a fairly lengthy discussion of the consequences of critical events, it is important to note that critical events were rarely the deciding factor in the successful outcome of a site's involvement in the RDU program. We have just seen that an event which would normally be considered a setback, such as a strike or principal turnover, can be a positive factor under some circumstances. Moreover, even a critical event whose influence is clearly negative is just one factor among many; its influence may be swamped by countervailing positive factors, such as strong leadership or an innovation that is clearly effective.

In the final analysis, we found no clear relationship between the occurrence of a critical event, or even a string of such events, and site success. Yet critical events were decisive in some instances, as the following cases illustrate.

No commitment. An elementary school adopted a career education package that consisted of materials and instructional aids to be worked into a teacher's daily instruction. Although the principal was the driving force behind the project, all decisions leading to the adoption were made by a site team consisting of six teachers, the principal, and a parent. After using the product for a year, most faculty felt it was a good one which fit the school's needs very well. A formal evaluation also yielded results which were substantially in favor of the product. Yet two years later, use of the product was minimal--almost nonexistent except among team members. The dynamic principal who had supported the innovation had moved to another school; the new principal did not care if teachers used the product. The most committed teacher on the site team had also been transferred. Furthermore, the district ran into financial problems resulting in larger classes; teachers said they barely had time to get through the basic text in each subject, much less to use the career education materials. Use of the product was optional, and not monitored. The product was seen as just another tool to be used or not, depending on time constraints and teacher inclination.

The new principal was also used to being more directive. The teachers at this school had always been independent and had pushed for involvement in decision making. The school had a very emotional staff meeting where the staff pressured the principal for greater participation. According to his own reports, he has tried to change. On this he said: "I don't tell them where I want them to be, but slowly manipulate them to that goal, with their inputs along the way."

The silver lining. A junior high school adopted a reading improvement program consisting of a great variety of strategies, one of which was to involve teachers of all subjects in the teaching of reading. Identification of a problem and selection of the solution had gone smoothly, despite the staff's underlying distrust of the central office. However, the first year of implementation was disastrous. First, the central office resisted the school's request for a full-time reading coordinator until late in August. The district reading specialist, who had guided the staff through the problem-solving process, resigned out of frustration in early June. Spurred on by the RDU field agent, the new district reading specialist was able to obtain approval of the new position; but by that time the local staff had already been assigned, and a new arrival from out of state was hired as coordinator. The new coordinator was inexperienced and, in addition, became involved almost immediately in a turf battle with the head of the language arts department. She was also perceived as being on the wrong side in a protracted contract dispute between the teachers' association and the central administration. She was never well accepted by the teachers and also felt she had no real support from the school principal. The project seemed doomed to failure after just one year. The turning point came when the reading coordinator left the school system and was replaced by the language arts chairperson. Although her approach was very low pressure, the language arts chairperson was able to get the project rolling. She also had the active support of a new principal, who was a firm believer in the importance of reading instruction. A prolonged teachers' strike at the beginning of the school year actually boosted teacher morale. They emerged from the strike as a cohesive unit (all but two had been involved) and devoted a great deal of their renewed energies to making the program work.

In summary, although the consequences of critical events are variable, depending on unique circumstances, it is clear that they do place limits on the extent to which one can rely on a rational, systematic, structural approach to the management of change. Critical events which change site conditions happen almost routinely, and therefore the change approach must remain flexible enough to cope with, and adapt to, changing circumstances.

WHO BENEFITED FROM THE RDU EXPERIENCE?

One objective of this chapter has been to answer the question, who benefited from the RDU experience? In particular, how successful was the RDU program in addressing issues of educational equity? Were schools "in need" able to benefit and acquire a greater capacity for knowledge utilization and consequent school improvement outcomes, or, as is frequently purported, did only the good and more sophisticated schools get better, at the expense of those in greatest need?

The previous analyses suggest that a number of local school characteristics were indeed significantly correlated with the intended and unintended outcomes that were found to be associated with the RDU experience. However, the predictive variables tended not to be the most non-manipulable demographic and descriptor variables such as those that would characterize the most advantaged, sophisticated, previously innovative, complex schools with many available resources. Instead, the predictor variables tended to be those which characterized structures, behavior and orientations of staff, and a focus on particular types of problems under the aegis of the RDU program.

To further explore the question of who benefited from the RDU experience, an analysis was undertaken to examine the differences between the schools that were found to benefit most from the RDU program and those that benefited the least. For this analysis, we turned to the "categorical outcome" classification that was described in Chapter 4. In that analysis, schools were grouped in six categories ranging from those which were low on all outcomes to those which were largely successful, or high on most outcomes, with the moderate, or largely spin-off successes in between. The two highest and two lowest groups of schools were compared to see if there were significant differences between the two clusters of groups on the site characteristics described in this chapter. The result of that analysis was largely confirmatory of the regression analyses. There were no significant differences between the two groups of schools on the demographic characteristics of rurality, size, index of pupil disadvantagement and SES, although there was a difference on percentage of staff who were male. (See Table 8-5.) For school problem characteristics, only the selection of classroom organization as the problem focus--discriminated between the two groups of schools. Once again the category of variables on which the most successful schools and least successful schools differed the most were behavioral and cultural features of the school, such as teacher influence in decision making, teacher orientation to change, the degree to which the principal was viewed as an instructional leader and the degree to which problem-solving activities had already begun. This suggests that the capacity of local schools to engage successfully in problem-solving activities and achieve school improvement outcomes is in large part a function of the power and influence relations, and cultural conditions within sites.

Table 8-5

DIFFERENCES ON SITE CHARACTERISTICS BETWEEN MORE SUCCESSFUL AND LESS SUCCESSFUL SCHOOLS IN THE RDU PROGRAM

Site Variables		F Value	Significance Level
Demographic Features			
Rurality	(N=109)	.86	.36
Community Turbulence	(N=67)	.28	.60
Index of Disadvantagement	(N=98)	.00	.99
SES	(N=104)	.60	.44
Number of Schools in District	(N=58)	1.32	.25
Number of Pupils in School	(N=110)	1.12	.30
School Level	(N=101)	2.38	.13
Behavioral and Cultural Features			
Teacher Influence in Decision Making	(N=97)	7.95	.006**
Principal Influence in Decision Making	(N=96)	1.84	.18
Superintendent Influence in Decision Making	(N=96)	.40	.53
Teacher Orientation to Change	(N=126)	7.40	.007**
Collegiality	(N=128)	.47	.49
Precedents for Change ("readiness")	(N=147)	.10	.76
Prior Problem-Solving Activities (pre-RDU "readiness")	(N=71)	5.12	.03*
Principal as Instructional Leader	(N=126)	8.23	.005**
% Male Staff	(N=110)	7.66	.007**
School Problem Characteristics			
Severity of Problem	(N=147)	.06	.80
Pupil Performance Problem	(N=71)	.52	.47
Classroom Organization Problem	(N=71)	4.43	.04*
Staffing Problem	(N=71)	1.61	.21

* $p. \leq .05$

** $p. \leq .01$

Overall, the disadvantaged, more rural, less innovative schools were just as likely to achieve knowledge utilization outcomes in the RDU program as their more "advantaged" counterparts. Most local site characteristics did not make a difference, nor were they a handicap. Thus if one views "equity" as the ability to achieve program outcomes regardless of external and non-manipulable conditions, a dissemination strategy such as that employed by the RDU program can address issues of educational equity.

SUMMARY

At the beginning of this chapter we indicated that theorists of the impact of local school characteristics on "innovativeness" or successful completion of a school improvement program could be classified into a number of groups--those who stress the climate or culture of the school, those who emphasize structural features, those who believe that staff characteristics will affect behaviors most significantly, those who believe in the importance of contextual characteristics (including student SES and achievement levels) and those who examine the characteristics of the intended area of change. Our data suggest that, at least among the schools studied in this program, two of these groups have greater explanatory power. Variables measuring the schools' climate for innovation were quite significant in explaining change, with particular importance being accorded to variables tapping the teachers' orientation toward change, and the experience of the school in prior problem-solving activities related to the problem in question. Also important in explaining school outcomes was the nature of the problem: a focus on classroom organization and/or pupil achievement tended to be associated with higher levels of change. However, other approaches also had some merit. For example, structural features of the school, particularly the degree to which teachers influenced the decision-making activities, affected the outcomes of the change program.

Unlike many other studies, our data do not indicate that the demographic characteristics of schools, including principal demographic characteristics, teacher demographic characteristics, or student characteristics have profound impacts upon the outcomes of participating in an innovative program. We found this to be a finding of some practical significance, since in most studies of "naturally occurring" innovation these non-manipulable factors have major impacts.

These findings suggest that local site characteristics that affect the outcomes of the change process are those that may, in fact, be most susceptible to change themselves. Thus, it is difficult to alter the level of a school--whether it is secondary or elementary. However, teachers with attitudes that are unsupportive of change may, in fact, be made more positive if they are given reason to believe that their efforts will be rewarded and will produce something of value. Similarly, since schools typically have an endless supply of problems that could be "managed," it is relatively simple to begin a major change program by emphasizing issues that relate to classroom and pupils.

Other findings, however, indicate a set of school contextual features that may be difficult to anticipate or manage, yet have significant

consequences for planned change activities. We refer here to the "normal critical events" which occur each school year, and which both disrupt and enhance the educational performance of schools. While these disruptions tend to be perceived negatively by those who experience them, in our data many unpleasant critical events had ultimately positive (or at least neutral) impacts on the school improvement activities fostered by RDU. In an equal number of cases, particularly where there was turnover among key staff members, serious disruptions could occur. As increased cutbacks in funding for education threaten the stability of school staffs, and also increase the rate of critical events in schools, the prospects for planned change may be diminished.

An important question remains. While local site conditions were predictors of school improvement outcomes, was their potency greater or less than the power of the intervention? This question is addressed in the chapter which follows.

CHAPTER 9

CONTEXT AND INTERVENTION: THE POTENCY OF MANAGED CHANGE

INTRODUCTION

In the previous chapters, we have seen that each of the three elements of the RDU intervention--the use of externally developed and validated products, external technical assistance, and an internal problem-solving process that promoted rational decision making and broad participation of various constituencies--had a measurable impact upon a variety of school improvement outcomes. We have also seen that the characteristics of the school and the problem context were strongly associated with school outcomes as well. Turning again to the schema (originally discussed in Chapter 2) which has guided this research (Figure 9-1), it is evident that the analyses presented in the previous chapters have only dealt with a limited number of its presumed relationships (i.e., those represented by arrows numbered 5, 6, 7 and 8). The previous analyses have not dealt with indirect effects on the school improvement outcomes such as the hypothesized relationships regarding the ways in which the strategies of the intervention can be reinforced, either by design (arrow 4), or within a dynamic process (arrows 2 and 3). Nor have we examined as yet the ways in which local conditions can affect the internal process (arrow 1). In order to examine the more dynamic aspects of the general model, we must move beyond the ultimate RDU school improvement outcomes, to look at the ways in which the intervention processes interact with or feed into one another.

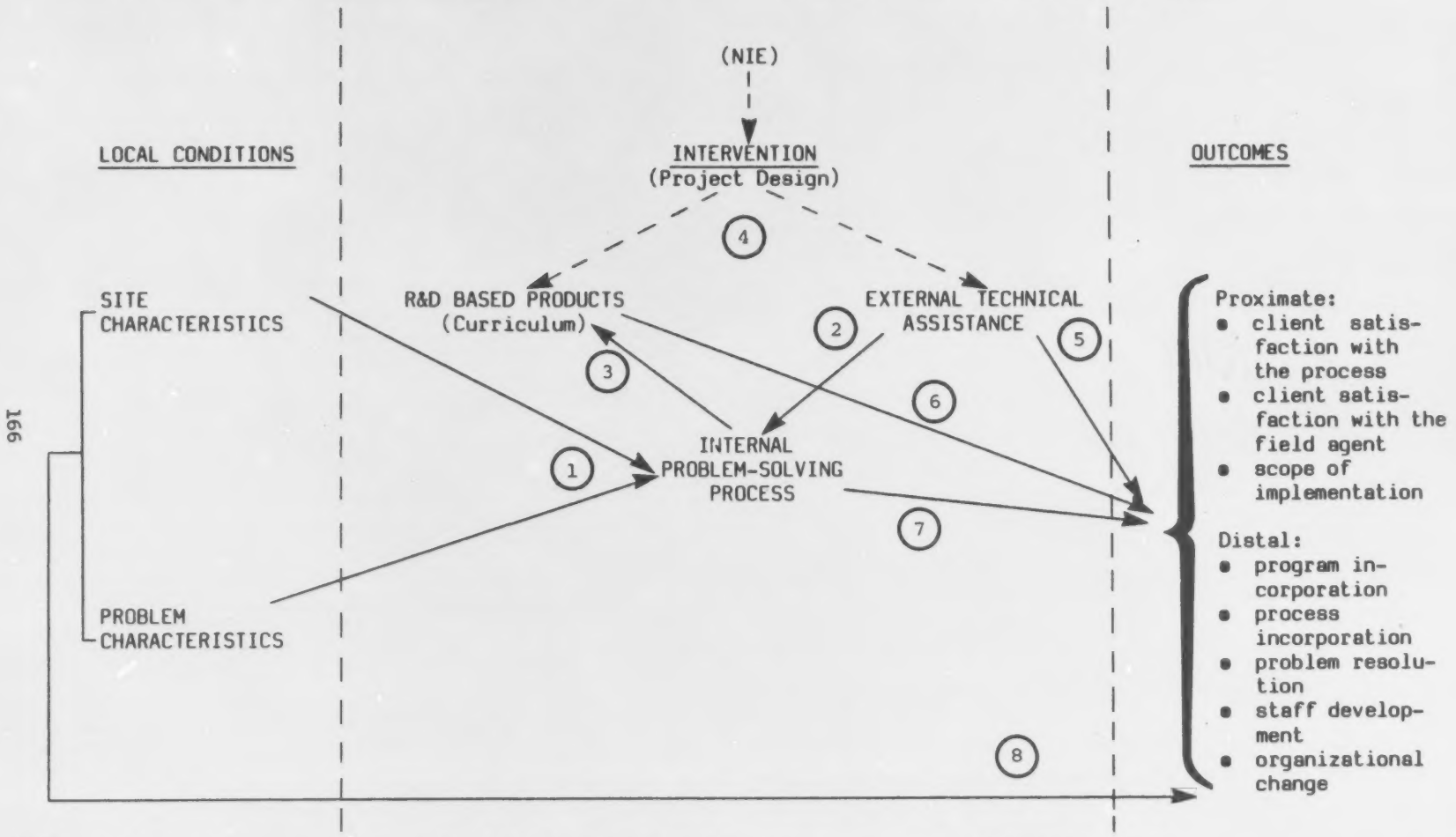
In addition, the previous analyses have not answered two more global questions that are not portrayed in the schema: Does the RDU approach to knowledge utilization and school improvement consist of three separate strategies, or does the combination of strategies have potency over and above the separate components? And, finally, does the support of a managed change approach through a combination of intervention strategies have any impact on school improvement over and above that accounted for by features of the school?

Thus, the purpose of this chapter is to "round out" the analyses that are depicted in the model, and to direct attention to competing hypotheses or alternative questions about how school improvement results are produced. In particular, the following questions are addressed:

- To what degree are the internal problem-solving processes affected by the general characteristics of the school (arrow 1), and the type of external assistance (arrow 2)?
- To what degree do internal problem-solving processes at the site account for the quality, validation, and difficulty of implementation of the products that are chosen (arrow 3)?
- Do project design features have an effect upon the types of services provided to schools, particularly those that are most predictive of site success (arrow 4)?

FIGURE 9-1

A SCHEMA FOR EXAMINING THE IMPACT OF KNOWLEDGE UTILIZATION ON LOCAL SCHOOLS*



*Lines and arrows represent hypothesized relationships which are reported in this volume; dotted lines and arrows represent hypothesized relationships which are discussed in other reports of the RDU study (Corwin, 1980; Louis and Rosenblum, 1981).

- To what degree do the three RDU strategies for change in combination have effects over and above the power of each separately (arrows 5, 6 and 7 together)?

- To what degree do features of the RDU intervention have an impact on schools over and above that explained by local site characteristics (arrows 5, 6 and 7 versus arrow 8)?

PREDICTING THE INTERNAL PROBLEM-SOLVING PROCESS: SCHOOL AND PROGRAM EFFECTS

Our model for examining the RDU program assumed that the internal problem-solving process was a function of both the characteristics of the local school and its setting (arrow 1)--particularly such features of the school as teacher change orientation, the degree to which teachers influence decision making in the school, and the "readiness" of the school as evidenced by previous problem-solving activities--and the training and support for problem solving that were provided by the project (arrow 2). In order to examine the impacts of these groups of variables on the problem-solving behaviors of schools, we first selected four indicators of the internal problem-solving process, based on their utility in other analyses and their correspondence to the expressed objectives of the RDU projects:

- extent of faculty influence in problem solving;
- breadth of participation in solution selection;
- breadth of participation in implementation; and
- overall quality of the problem-solving process.

These variables were then regressed upon eight site characteristics --school level, percentage of disadvantaged pupils, teacher influence over decision making, teacher change orientation, school size, prior activities in problem solving, and whether the problem focused on pupil performance or classroom organization--and eight external technical assistance variables--field agent initiative, field agent time spent with the team, field agent contact with the principal, field agent innovativeness, political and structural perspectives of the agent, amount of specialized training, and variety of trainers. The results of this stepwise regression are presented in Table 9-1.

Several findings are revealed by this table. First, in combination, site characteristics and external agent characteristics are moderately good predictors of the internal problem-solving behaviors of schools. More than 25% of the variance in each dependent variable is explained, using the adjusted multiple R^2 statistic. The level of explanation is highest in the case of the quality of decision making in the problem-solving process, where the adjusted multiple R^2 is .34.*

*These adjusted multiple R^2s are considerably higher than those achieved when the regression is performed separately for site and external assistance variables, which indicates that the two groups of variables in concert are of importance in determining the outcomes of problem-solving activities (analysis not tabled).

Table 9-1

STANDARDIZED REGRESSION COEFFICIENTS+ FOR
THE RELATIONSHIP BETWEEN INTERNAL PROCESSES
AND SCHOOL CHARACTERISTICS AND EXTERNAL ASSISTANCE
(N = 45)

	Internal Process			
SCHOOL CHARACTERISTICS	Faculty Influence	Breadth of Involvement in Solution Selection	Breadth of Involvement in Implementation	Quality of Problem Solving
School Level (elem/second)	-.86**	.42**		
% Disadvantaged				-.41*
Teacher Influence	.44**	.21	.19	
Teacher Change Orientation		-.17	-.17	
School Size		.27		-.57*
Prior Problem-Solving Activities		.29*	.31**	-.30
Pupil Performance Problem				-.24
Classroom Organization Problem	-.27	.17	-.19	-.21
EXTERNAL ASSISTANCE VARIABLES				
Agent Initiative			.13	
Agent Time on Site			.22	.64**
FA Political Orientation			-.14	
FA Structural Orientation				.29
FA Innovativeness				-.34*
Agent-Principal Contact				
Amount of Training	.72**	.23	.18	
Variety of Training		.23		
Multiple R^2	.33	.40	.42	.46
Adjusted Multiple R^2	.26	.27	.29	.34

*$p \leq .05$

**$p \leq .01$

+ Beta Coefficients are presented only for those variables which contributed to the reported multiple R^2. The selection process was stopped when additional variables failed to increase the Multiple R^2 by 1% or more; the order of entry was unforced.

Overall, however, the patterns of relationships for most individual variables are relatively weak and/or scattered, while in several cases variables appear to have opposite impacts on different aspects of the problem-solving process.

Thus, for example, secondary schools have lower levels of faculty influence, but broader involvement in the process of solution selection. This suggests that central office personnel may become more heavily involved in determining the nature of the product to be implemented--but at the expense of broad participation within the school. Of course, in the case of secondary schools, many of the products were designed to be implemented by a small subset of teachers--a specific department (basic reading programs were often limited to social studies and language arts departments) or even to a few individuals (career education programs which focused on guidance or career experience activities). In these cases, the decisions often involved major staff allocation and scheduling questions that were quite different from the adoption of a school-wide reading management program in an elementary school. In summary, elementary and secondary schools do appear to behave quite differently.

Another example of inconsistent relationships between a school characteristic and the internal process is the positive association between the school's prior attempts to solve the problem and the breadth of involvement in solution selection and implementation, but the negative (although non-significant) relationship of prior activity to the quality of the problem-solving process. Schools that had already engaged in significant activities to solve their identified problem had typically turned to central office personnel for assistance. Thus, these individuals were already involved in problem-solving activities--and had often already determined the nature of the problem and perhaps even the solution they wished to implement. In a number of cases in our intensive sample, the RDU process was simply superimposed upon the pre-existing decisions sometimes by the central office and the principal and sometimes by a broader coalition of actors. In these cases the RDU program was most often used "opportunistically," to help carry out a decision that was already made, and one which was often not based on the rational decision making model promoted in the RDU program.

The role of external technical assistance appears to be less formidable in predicting the breadth of involvement in solution selection and implementation than local site characteristics. However, it is of approximately equal weight in its impact on the quality of the problem-solving process. Again, as in Chapter 6, we find that field agents who spend as much time as possible in actual interaction with the local problem-solving team, and those who adopt relatively conventional approaches to the innovation process have much greater impact. Training variables, which were extremely potent predictors of actual school outcomes, are of less importance in predicting the internal process: we find that the amount of training is related to overall faculty influence in the problem-solving process but, as noted in Chapter 6, this finding is somewhat confounded by evidence from the qualitative site data, which suggest that faculty with more influence tended to look for and demand more training.

A final observation of interest is that there is a clear pattern suggesting that school factors which do not predict the ultimate degree of "success" may still have a strong impact on the quality of the problem-solving process. Big schools and schools with a high proportion of disadvantaged children exhibited relatively poor decision-making behaviors in the context of the R&D Utilization program. Yet, as noted in Chapter 8, they are no less likely to achieve other benefits.

Overall, these findings suggest several conclusions. First, although we have learned that the nature of the problem-solving process is important to determine school improvement and knowledge utilization outcomes, our ability to model the factors that affect the quality of the problem-solving process, and the degree to which it involves participation both of faculty and other key decision makers, is far from satisfactory. Second, the data suggest that, in pursuing additional explanations, levels of participation and influence are probably best explained by characteristics of the local setting and the type of problem that is being addressed, while the general rationality of the decision-making process is somewhat more amenable to external intervention.

A second set of analyses was conducted in order to examine the relationship between external assistance and the internal process (arrow 2). We had initially hypothesized that there would be an interaction effect between the role of the field agent and the role of the "internal change agents," mainly the principal, but also possibly central office specialists. It appeared, based on our field visits, that in many cases the field agent role was a compensatory one. When there was a very active "internal change agent," the field agent's role was more minimal and less initiating, but when there was no one playing an internal leadership role in the change process, a field agent often filled in. We conducted an extensive "search" for interaction effects, using variables measuring principal influence, central office specialist influence, and faculty influence, in interaction with field agent initiative and field agent time. However, not a single two-variable interaction proved to contribute significantly to the explanation of any school improvement outcome.* Thus, we are led to the conclusion that the relationship of internal to external change agents is, on the whole, an additive one.

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*The search for interaction effects was conducted as follows. First, a pair of terms that were expected to interact was selected. An interaction term was calculated by subtracting the mean from each variable, and multiplying them. The main terms were entered in a regression first, with the interaction term entering in a second step. Interaction terms would be considered significant if they (1) had a regression coefficient whose F statistic was significant at the .05 level; and (2) contributed at least 2 percent to the multiple R2 of the dependent variable. If interaction terms had turned out to be significant, then further explication through cross-tabular analysis would have followed, as done in Rosenblum and Louis, (1981).

PREDICTING PRODUCT QUALITY: THE IMPACT OF INTERNAL PROCESS ON SOLUTION SELECTION

The model presented in Figure 9-1 hypothesizes that the internal problem-solving process had considerable impact upon the quality of the products that were selected for implementation (see arrow 3). In addition, we have argued that the negative relationship that was found in Chapter 5 between adaptation of the products and school improvement outcomes was a consequence of the attention paid to matching the characteristics of the proposed new practices to actual needs--a process that is not always evident in organizational decision making. In this analysis, we seek to examine the impacts of the problem-solving behaviors in the school (level of effort and problem-solving quality), the roles played by various actors (principal influence, faculty influence, superintendent influence, other central office influence) and the breadth of involvement in decision making (solution selection and implementation) on product characteristics. The following product characteristics were selected because they effectively predict at least some school-level outcomes, and because they clearly reflect some dimension of product value:

- the quality of the product (an index made up of the teacher's perception of the novelty of the ideas presented, their applicability in the classroom setting, and the adequacy of information about how it could be implemented);
- the degree to which the product required major changes for the classroom teachers (difficulty of implementation); and
- whether there was evidence that the product had been field tested or validated.

A final product variable was selected to reflect the process of implementation:

- post-implementation adaptation, or the amount of change made in the recommended product or practices after implementation began.

The results of a stepwise regression including these variables is presented in Table 9-2.

One statement that can be made quite clearly based on the relatively low adjusted multiple R^2s is that the data do not support the program design premise that a good internal problem-solving process results in the adoption and implementation of the products with characteristics that are predictive of the school improvement outcomes (such as product quality, difficulty of implementation and field test/validation status). In each regression, even the unadjusted R^2s are quite small, particularly compared with those that have been found in other analyses. Only in the case of post-implementation adaptation do we find a level of prediction which meets the rough standard of policy and theoretical significance that we have used in prior analyses (that the adjusted multiple R^2 should be at least .15).

Table 9-2

STANDARDIZED REGRESSION COEFFICIENTS+ FOR THE
RELATIONSHIP BETWEEN PRODUCT CHARACTERISTICS AND INTERNAL PROCESS
(N=57)

Internal Process Variable	Product Characteristics			
	Product Quality	Difficulty of Implementation	Field Test/ Validation	Post-Implementation Adaptation
Level of Effort			.11	.13
Quality of Problem-Solving Process				-.24**
Faculty Influence on Process		.19		
Principal Influence on Process			.24*	-.37**
Superintendent Influence on Process	-.23	.20		-.19
Other Central Staff Influence on Process	.29*	.33*	.20	
Breadth of Involvement in Solution Selection	.15	-.17		.16
Breadth of Involvement in Implementation			.16	.24
Multiple R^2	.15	.16	.17	.28
Adjusted Multiple R^2	.10	.10	.11	.19

*$p \leq .05$

**$p \leq .01$

+Beta Coefficients are presently only for those variables which contributed to the reported multiple R^2. The selection process was stopped when additional variables failed to increase the Multiple R^2 by 1% or more; the order of entry was unforced.

However, despite the unimpressive power of the equations in predicting product characteristics, some of the individual patterns of relationships are useful in illuminating the impact of process on product selection. Two patterns which stand out, and help to explain the role of administrators and specialists in the process, are those involving the influence of central office specialists and the principal. Earlier, in Chapter 7, we noted that the role of the principal in determining school outcomes was surprisingly limited given the significance attributed to that role in the literature. We also posited, however, that the principal's role was less direct in the RDU process because the more effective principals encouraged high levels of faculty influence and ownership. Here we see a confirmation that the principal's role may be a more supportive and indirect one. Principal influence has particularly strong and significant impacts upon the selection of field-tested or validated products, and is negatively related to adaptation during the post-implementation period. This suggests that the role of the principal may be important in internal quality control, both in the initial selection of a solution, and in maintaining a school-wide focus--i.e., providing an environment which discourages a great deal of localized classroom adaptation. (Most post-implementation adaptation, according to data gathered in site visits, involved individual teacher adaptations rather than actual redesigns of a school-wide program.)

The role of the central office specialist also emerged as relatively important in many of our site visits, yet had little direct impact in predicting the school improvement outcomes. Again, however, these data suggest that the specialist's role may be strongly weighted toward influencing the quality and significance of the solution selected, providing support for faculty members to attempt more than they might have otherwise, and encouraging the selection of products that are well matched to the needs of the school. The fact that the central office specialist's role also emerges as a factor in predicting the field-tested/validation status of the product reinforces this view.

Two other findings are of interest, largely because they confirm findings that emerged from the site visits. First, as we expected, the quality of the problem-solving process is affirmed as a mechanism for reducing the requirement for post-implementation adaptation. Where the process has been attentive to the more rational aspects of problem-solving--including techniques such as developing specific criteria against which to assess alternative solutions to the problem, conducting serious assessments of alternatives, developing relatively detailed plans for implementation (including plans for training, monitoring implementation, and correcting any problems that arise)--extensive adaptations are typically not necessary. This finding does not, of course, imply that the implementation process was not a dynamic one. In fact, self-correcting feedback was part of the definition of a high quality problem-solving process against which the school's activities were measured. However, fine-tuning should not be confused with changes which alter basic features of the intended innovation, nor should ad hoc adaptation by individuals (which may, cumulatively, have the effect of changing the intended innovation) be confused with planned adjustments. When adjustments were made in many of the schools that ranked among the highest on the quality of their problem-solving processes, they were accompanied by consultation or further training from the developer or other consultants.

Another interesting finding within Table 9-2 concerns the role of broad involvement in implementation. Implementation involvement makes a positive contribution to overall school improvement outcomes and is also positively related to post-implementation adaptation ($p = .055$). We believe that this relationship, although weak, highlights a problem of transition which occurred for many of the schools, and which was discussed in detail in an earlier report (Kell and Louis, 1980). This dilemma concerns the change from a relatively small facilitating team to a more broadly based decision-making or implementing team. Because this transition often involved substantial increases in the number of "actors" who were expected to participate, the additions of new agendas and issues raised problems for the "quality control" of the process. We believe that this problem with transitions accounts for the apparently positive relationship between broadly-based influence over implementation decisions and post-implementation adaptation.

PROJECT DESIGN AND MANAGEMENT AND THE DELIVERY OF SERVICES IN THE RDU INTERVENTION

Prior sections of this chapter discussed the degree to which the internal problem-solving processes were affected by the characteristics of the school (arrow 1) and the type of external assistance that they received (arrow 2). We also described the impact of the internal decision-making processes on the characteristics of the products that were chosen (arrow 3). In this section, we move to the next question implied by the scheme depicted in Figure 9-1: Do project design features have an effect upon the types of services provided to schools, particularly those that were most predictive of site success (arrow 4)?

The RDU program, like many other federal and state-funded school improvement programs (particularly those that provide indirect support) assumed that the management of change occurs not only at the local level, but at a broader project level. It is through projects, state departments, or other service agencies providing support that the services to be delivered are designed and coordinated. The RDU program announcement (NIE, 1975) explicitly assumed that the projects could directly affect both the products and other information that would be made available to schools, and also the various types of technical assistance, training or other human resources that would be provided.

Other recent theories of change and implementation, however, might cause us to question whether program design features will be translated into the types of services expected at the local level. Many studies, including our own, have pointed out how there is considerable "slippage" between the design of a program and what actually occurs at the service delivery level (Yin, Gwaltney and Louis, 1980; Corwin, 1981). In addition, analyses of project structures such as those in the RDU program have used the imagery of the "dispersed organization" (Louis and Sieber, 1979), and have argued that developing central control over the actual delivery of services is extremely difficult when the project management is located in a central office, while the actual service delivery personnel are based in the field. Finally, an "evolutionary" imagery of program implementation argues that programs are continuously altered in the field, so that the visible impact of design features becomes insignificant after a period of sequential

reinterpretation and modification (Farrar et al., 1980). Thus, one of the questions that should be asked about any strategy for school improvement is whether the designers and managers of a program and the projects within it had any impact upon the services delivered to schools, and on their outcomes. This issue has been addressed in detail in another volume (Louis and Rosenblum, 1981) largely through the use of case studies of four of the seven RDU projects. In this section we summarize some of the main findings from that volume on the question of project impact on service delivery.

Table 9-3 presents the results of several analyses of variance which determined whether there was a significant difference between all seven projects on variables describing the products that were used and the external assistance that was provided. As is immediately apparent, of 11 ANOVAs that were calculated, eight resulted in significant differences between projects. In all cases, these differences were substantial, with F statistics significant at the .01 level or better (not tabled). Furthermore, the characteristics of the intervention on which there were significant differences are those that were found to be highly predictive of school improvement outcomes (as reported in Chapters 5 and 6).

In addition, it is also clear from the dichotomization of scores in the intervention variables that there are some patterns to these differences between projects. Two of the projects (Number 4 and Number 6) rank above the mean on all of the intervention variables for which there are significant differences. Another two (Project 5 and 7) rank below the mean on all variables. The remaining three projects have more mixed distributions. Project Number 3, for example, ranked high on three of the four measures of product quality, and high on both measures of field agent services. It ranked low, however, on the amount of training provided, both in total amount and variety. Project 1 had, in general, a profile indicating only a few areas of major strength--the field agents spent a lot of time on site, and the products generally required considerable effort to implement. For all other areas, however, its profile was low. Project 2, on the other hand, appeared to promote high quality, validated products of a simpler nature, and tended to provide a fair amount of local technical assistance, but with less intensive field agent-site contact.

Not surprisingly, these patterns of differences by project are highly consistent with the distribution patterns of school outcomes. The dichotomization of scores on school improvement outcomes for the seven projects (also shown in Table 9-3) parallels very closely the high/low dichotomy of intervention variables. Thus, Projects 4 and 6 not only rank above the mean on the characteristics of the intervention, but also consistently rank high on school outcomes. Similarly, Projects 5 and 7 rank low on both intervention strategies and impacts. This analysis provides strong support to the hypothesis that project design features can have a relatively broad impact upon the actual services delivered and their outcomes.

Bearing in mind that each RDU project was designed as an interorganizational network, with its own network design and management characteristics (see Louis and Rosenblum, 1981), we can ask an additional question. Are these differences in project profile a consequence of organizational design and management, or simply an artifact of localized adaptations within the project? Table 9-4 provides a partial answer, as it presents the results

Table 9-3

Results of Analysis of Variance of Measures of Characteristics of the Products and External Process and Outcomes for the Seven Projects*

	Projects						
Product Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Product Quality (N=179)	L	H	H	H	L	H	L
Difficulty of Implementation (N=179)	H	L	L	H	L	H	L
Field test/validation status (N=90)	L	H	H	H	L	H	L
Complexity (N=90)	L	L	H	H	L	H	L
Adequacy of Guidance for Implementation (N=90)	(not significant)						
Pre-Implementation Adaptation (N=90)	(not significant)						
Post-Implementation Adaptation (N=90)	(not significant)						
External Assistance Variables							
FA Initiative (N=90)	L	H	H	H	L	H	L
FA Time on Site (N=90)	H	L	H	H	L	H	L
Amount of Training (N=179)	L	H	L	H	L	H	L
Variety of Training (N=179)	L	H	L	H	L	H	L
Outcomes							
Organizational Impacts	L	H	L	H	L	H	L
Product Incorporation	H	H	L	H	L	H	L
Process Incorporation	H	H	L	H	L	H	L
Problem Solved	L	L	L	H	L	H	L
Scope of Implementation	L	H	L	H	L	H	L
Personal Impacts	L	H	H	H	L	H	L

*Project scores were dichotomized at the mean. H indicates that the project was above the mean; L that it was below.

Table 9-4

RELATIONSHIP BETWEEN PROJECT DESIGN AND MANAGEMENT CHARACTERISTICS AND THE RDU INTERVENTION (t Statistics)

	Project Characteristics				
Product Characteristics	Readiness[1]	Span	Centralization	Support	Pre-existing Structure[3]
Product Quality (N=179)	+1.75*	+2.35*	N.S.	+2.02*	N.S.
Difficulty of Implementation (N=179)	+3.23**	N.S.	N.S.	N.S.	N.S.
Field test/Validation Status (N=90)	+3.11**	+3.88**	N.S.	+2.68**	N.S.
Complexity (N=90)	+4.41**	N.S.	N.S.	+3.36**	-1.95*
Pre-Implementation Adaptation (N=90)	N.S.	N.S.	+2.10*	N.S.	N.S.
Post-Implementation Adaptation (N=90)	N.S.	N.S.	N.S.	N.S.	N.S.
Guidance for Implementation (N=90)	+2.19*	+2.42*	N.S.	+2.58**	N.S.
External Assistance					
FA Initiative (N=90)	+6.33**	N.S.	N.S.	+3.99**	-3.04**
FA Time on Site (N=90)	+4.52**	N.S.	+2/13*	N.S.[2]	N.S.
Amount of Training (N=179)	+2.98**	N.S.	N.S.	N.S.	N.S.
Variety of Training (N=179)	+4.23**	N.S.	N.S.	+2.68**	N.S.

[1] More ready projects had less FA contact.
[2] t sig. at .06
[3] Projects with pre-existing structure had lower FA initiative and less complex products.

* $p \leq .05$
** $p \leq .01$

of a series of t tests in which product and technical assistance characteristics are classified by a series of dichotomized project characteristics. These project characteristics are:

- Organizational readiness: the degree to which the participating organizations had previous experience in delivery services of the type provided in RDU;
- Project span: whether the project was organized to serve a single state, or was organized on a regional/national basis;
- Project centralization: the degree to which the central office of the project attempt to exercise a high level of influence over activities in the field;
- Project support: the degree to which the host organization in which the project was located was highly supportive of the project; and
- Network readiness: the degree to which the interorganizational arrangements used in delivering services predated the preparation of the RDU proposal.

Table 9-4 supports the assumption that network design features are highly associated with the actual services delivered to schools. For example, the t tests for project readiness are significant in nine of the 11 service characteristics measured. For support, significance is achieved in six of 11 t tests, and more scattered findings are located for span, centralization and network readiness. Moreover, the results of the t tests are highly consistent with earlier findings: projects that are more ready in terms of organizational capacity and experience deliver higher quality products, which typically require greater changes in the schools, which are more likely to be field tested, and which offer more guidance for implementation. They also have field agents with higher levels of initiative, who spend more time on site, and provide more and more varied training (not tabled)--once again, variables which were found to be highly predictive of school improvement outcomes. Projects covering areas larger than a state tended to offer products of lower quality, lower field-test/validation status, and less guidance for implementation, although they did not differ significantly in the amount of assistance provided by field agents or trainers. Projects with strong support systems generally had higher quality products, and more technical assistance, at least in those areas where there were significant differences. Finally, projects which relied on pre-existing networks tended to use lower levels of field agent initiative (perhaps partly because they relied on agents already in place who had other work commitments in addition to RDU), and also tended to deliver products of lower complexity; more centralized projects were more likely to support pre-implementation adaptations, and were also more likely to deliver high levels of field agent time at the site level.

Readers who are interested in a more elaborate explanation for some of these findings should turn to Louis and Rosenblum (1981). However, we may summarize the data presented there as follows. First, projects have

important effects on the nature of services that are delivered, even in a demonstration project which is in an evolutionary, early implementation stage, and which relies on a dispersed organizational structure with relatively low supervisory authority. Second, it is clear that some features of organizational design, most particularly the readiness of the organizations and the degree to which the project host provides high levels of support for the project, tend to be associated with the delivery of services that are shown in our previous chapters to be associated with higher levels of school improvement outcomes of various types.

These findings do not discredit theoretical and empirical studies which emphasize the "looseness" of interorganizational modes of service deliverers, and the problems of delivering services as they are planned at federal and state levels. Rather, they simply serve as a caution to theorists to refrain from overinterpreting evolutionary or "loose coupling" explanations. While the design and management of intervention programs is far from a science, we may still expect to see some correspondence between organizational intent and action. Several of the seven projects that were studied intended, for example, to deemphasize field agent initiative and time on site, and to emphasize simple products which did not necessarily meet criteria of strict validation. These stand out, in our profiles in Table 9-3, as having done what they intended, at least to some degree. In addition, the analysis presented briefly here, and in greater detail in Louis and Rosenblum (1981), indicates that sound planning and management practices are reflected both in more consistent delivery of services, and also in higher levels of school outcomes. While there was considerable local evolution in both design and management, key features of the projects' strategy of intervention tended to be preserved in ways that are measurable at the school level.

THE IMPACT OF THE INTERVENTION: PRODUCTS, PROCESS, PEOPLE AND SITES

The previous sections of this chapter have attempted to explicate relationships between groups of variables which reflect the local features of the school site and the interventions, basically focusing on "filling in" hypothesized causal relationships which were presented in a schema for analyzing the outcomes of school improvement efforts. In this section, the general theme of this chapter, which is to better understand the dynamics of the powerful predictive results presented in Chapters 5 through 8, will be maintained. However, we shift themes, and move from trying to understand how various aspects of the intervention are explained, either by site characteristics, project characteristics, or each other, back to an emphasis on the school improvement outcomes. Two major questions are addressed in the remainder of the chapter. The first focuses on how three components of the RDU intervention--products, process, and people to provide assistance--contribute jointly to the outcomes. The second concerns the degree to which the RDU intervention strategies have an impact on the school improvement outcomes (organizational change, program incorporation, process incorporation, problem resolution and staff development) over and above that which is explained by local site characteristics.

Combining the Three Intervention Strategies

Previous chapters examined the impact of each aspect of the intervention separately (arrows 5, 6 and 7). Overall, characteristics of the product and of external human assistance each separately explained greater percentages of variance in school outcomes than the internal problem-solving activities. Not surprisingly, incorporation of the problem-solving process was the only outcome that was affected more by the internal problem-solving activities than by either of the two external interventions.

However, the impact of the RDU intervention cannot be understood by only examining the three intervention strategies separately. In reality the intervention combined the three strategies, and it is therefore important to examine the potency of the combined approach (i.e., arrows 5, 6 and 7 together). Two separate statistical approaches were used in this exploration: canonical correlations and multiple regressions.

In examining the impact of a complicated and ambitious program like RDU, we must not only face the multi-faceted nature of the intervention itself, but also the fact that the program's impacts may be highly diverse. For RDU, therefore, the disarmingly simple question, "Did it work?" does not have an equally simple answer unless we can make use of an analytic technique which allows us to simultaneously relate a number of "treatment" indicators to several outcome measures in a single analytic operation. Canonical correlation analysis provides us with just such a tool by determining whether any combination of the treatment variables (a canonical variable) is significantly related to any combination of outcome measures (also a canonical variable), and if so, how many such combinations may be identified, and what is their composition?

To make an assessment of the impact of the combined RDU intervention strategy, a group of 19 treatment measures and a second group of five outcome measures were used for the canonical correlation analysis. These variables cover the gamut of product, external assistance and internal process treatment indicators, and the ultimate site-level outcomes.

The canonical analysis revealed a single significant canonical correlation of .84 ($p < .001$). That is, the analysis identified a canonical variable, or best weighted combination of treatment variables which was significantly correlated with a combination of outcome measures, strongly indicating that the treatment was, in fact, associated with the outcomes. But it is the composition of these treatment and outcome combinations which is of greatest interest here. The most salient treatment and outcome variables were identified by taking .50 as the minimum "significant" correlation between a treatment or outcome measure and the canonical variable encompassing it. These appear with asterisks in Table 9-5, where it is interesting to note that all three aspects of the RDU treatment are represented--product, process, and external resources. In addition, the relative size of the coefficients is similar between variable groups. This suggests that not only is the RDU treatment related to outcomes, but also that the optimal treatment includes all three of the RDU strategies.

Table 9-5

CANONICAL ANALYSIS OF RDU TREATMENT IMPACT

TREATMENT MEASURES		OUTCOME MEASURES	
Internal Problem Solving Activities			
Principal Influence	.45	Problem Solved	.72*
Faculty Influence	.51*	Organizational Impacts	.93*
Breadth of Involvement in Solution Selection	.41	Personal Impacts	.53*
Breadth of Involvement in Implementation	.51*	Product Incorporation	.90*
Level of Effort	.35	Process Incorporation	.33
Quality of Process	.44		
External Assistance			
Agent/Principal Contact	-.30		
Agent Innovativeness	-.10		
Agent Time on Site	.40		
Agent Initiative	.42		
Agent Political Perspectives	-.02		
Agent Structural Perspective	-.09		
Amount of Training	.50*		
Diversity of Training Sources	.55*		
Product Characteristics			
Product Quality	.56*		
Difficulty of Implementation	.51*		
Product Validated	.42		
Relative Advantage	.51*		
Product Complexity	.53*		

*Variables correlated .50 or more with canonical variation of their group. Canonical correlation = .84 (ok < .001).

The combination of "significant" outcome measures making up the global outcome canonical variable includes the following:

- the extent to which principal and teachers report the problem has been solved;
- impacts on the school as an organization;
- personal impacts on participating staff; and
- incorporation of the adopted product/materials.

Incorporation of the problem-solving process was not a salient component of the canonical outcome variable in this analysis of the RDU program's site-level impacts.

The combination of treatment measures is informative. The product characteristics which are involved include the overall assessment of the product's quality drawn from the teacher survey. This assessment includes ratings of whether the product was relevant to school problems, met a need in the classroom, and provided new information. A second product characteristic is teachers' ratings of how difficult the product was to implement. This rating includes such considerations as the extent to which implementation of the product required the teachers to change the ways their classrooms were organized, changes in teaching style, substantial additional record keeping, and a general assessment of how hard the product was to implement. The extent to which the adopted product or materials represented an improvement over previous practice was also "important". Closely related to the assessment of difficulty in implementation is the other salient product variable, the complexity of the product.

Note that all four product variables are positively related to school outcomes. That is, not only is product quality positively related to outcomes but difficulty of implementation and complexity are also positively related to program impacts. This suggests that where a greater level of effort is involved in implementing the product, its impact is likely to be greater, perhaps because it requires greater commitment on the part of its users. This interpretation is also supported by the other salient treatment variables in this analysis. Among the process indicators, for example, breadth of participation (in the sense of the number of different groups involved) in implementation activities is also positively related to school outcomes, as is the overall level of influence the faculty as a whole has on the problem-solving process. Finally, the number of sources from which school staff received training in product use, and the total amount of training received were also positively related to outcomes.

In summary, this analysis suggests that while all three dimensions of the RDU treatment are positively related to school-level outcomes, the optimal treatment may include aspects of all three in combination.

Multiple regressions of outcomes on a set of independent variables drawn from each of the three intervention strategies were also conducted. The following variables were chosen:

- product variables: product quality, product complexity, product validated, and difficulty of implementation;
- external human assistance variables: agent/principal contact, amount of training received, diversity of training, and agent time on site; and
- internal problem-solving process variables: faculty influence in the process, breadth of participation in solution selection, breadth of participation in implementation and the quality of the problem-solving process.

Highly consistent with the canonical analysis, Table 9-6 indicates that the real potency of the intervention is likely to have been a function of the combination of strategies, resulting in high or very high percentages of variance explained on each of the school outcomes. (For example, adjusted multiple R^2s were well over 50% for organizational impacts and for product incorporation. Even process incorporation, the most elusive of the school outcomes in our analyses, had 24% of the variance explained by the best weighted sum of six variables drawn from each of the intervention categories.) It is particularly interesting that, for each outcome, the variables that contributed to the explanation of the outcome were drawn from each of the intervention strategies. Furthermore, with the exception of one outcome, a best weighted sum of intervention strategies is a more powerful predictor of the outcome than any of the individual intervention categories (see Table 9-7). The one exception is the outcome of "problem solved" which is predicted better by product variables (R^2=.46) than by a combination of strategies (R^2=.41).

The most important predictor variables of the combined intervention strategies are product quality (which enters into the equation for each outcome); product characteristics such as complexity and prior validation, amount of training received, agent time on site, faculty influence in the process and breadth of participation in solution selection and implementation. Product characteristics and diversity of training appear to be particularly important to product incorporation; but ironically, product quality and prior validation are negatively related to process incorporation. The only significant positive association with both program outcomes occurred for the diversity of training variable.

How can one explain the relatively low impact of the intervention on process incorporation? While most of the RDU projects had stated objectives of process incorporation, case study and site visit data reveal that in fact the primary focus of the intervention was to provide assistance for engaging in a specifically targeted problem-solving process with the objective of ultimately adopting and installing a new product or practice to solve a particular problem. While some training in the process was included, it was hard for the sites to concentrate on the capacity-building function at the same time as effort was being expended to solve a particular problem.

Table 9-6

STANDARDIZED STEPWISE REGRESSION (BETA)+ COEFFICIENTS
FOR THE RELATIONSHIP BETWEEN COMBINED INTERVENTION STRATEGIES AND
SIX MEASURES OF SCHOOL OUTCOMES
(N=75)

Intervention Strategies	Measures of School Outcome					
	Organizational Impacts	Product Incorporation	Process Incorporation	Problem Solved	Scope of Implementation	Personal Impacts
(Product)						
Product Quality	.18*	.12	-.20*	.58**	.22*	.36**
Product Complexity	.29**	.15*				.28**
Product Validated		.18*	-.27**		.20*	
Difficulty of Implementation						
(External Assistance)						
Agent/Principal Contact	.17**			.13		.13
Amount of Training	.22**		.18*		.21*	.22**
Diversity of Training Sources		.30**	.23*			
Agent Time on Site		.14			.37**	-.30**
(Internal Problem-Solving Activities)						
Faculty Influence	.09		.09	.16**		
Breadth of Involvement in Solution Selection			.20*		.16	.08
Breadth of Involvement in Implementation	.16	.21**				-.17
Quality of Process	.11*					
Multiple R^2	.59	.56	.30	.43	47	.42
Adjusted Multiple R^2	.55	.52	.24	.41	.43	.36

+ Beta Coefficients are presently only for those variables which contributed to the reported multiple R^2. The selection process was stopped when additional variables failed to increase the Multiple R^2 by 1% or more; the order of entry was unforced.

* $p \leq .05$

** $p \leq .01$

Table 9-7

PERCENTAGE OF VARIANCE IN OUTCOMES EXPLAINED BY THREE STRATEGIES OF THE INTERVENTION AND THE COMBINED INTERVENTION STRATEGIES*

(N = 75)

Predictor Variables	Outcomes					
	Organizational Impacts	Product Incorporation	Process Incorporation	Problem Solved	Scope of Implementation	Personal Impacts
Product Characteristics	.28	.40	.10	.46	.26	.30
External Assistance	.36	.40	.10	.17	.41	.14
Internal Problem-Solving Activities	.34	.12	.15	.11	.12	.02
Combined Intervention Strategies	.55	.52	.24	.41	.43	.36

*Adjusted multiple R^2.

Furthermore, the field agent or facilitator was viewed as crucial to the process, and without special project support, was not likely to be available to the local site again.

Since the paths for reaching the objectives of process incorporation and product incorporation are quite different, it should be emphasized that the interpretation of their potential incompatibility is quite speculative and does not imply that there is any inherent conflict between the RDU objectives of building capacity through increasing participation and rationality in the problem-solving process and implementing a high quality program. When it comes to the question of incorporation, however, it may well be that the level of effort and commitment to routinize the use of both product and process is too great for most schools. Our site visits revealed, for example, many instances in which school district administrators, in making resource allocation decisions after the end of the RDU project, made implicit commitments to either process or product. For example, in one district, where it was agreed by many staff members that the participatory process was a key ingredient to the effective implementation of a complex reading program in the junior high school, the district office nevertheless determined that the program would be implemented by fiat in the remaining junior high schools in the district, because they could not afford to have each school go through a similarly intensive period of decision making and training. In another district, a principal freely admitted that the use of R&D products per se was of little interest to him after completing the project: what he wanted to preserve was the annual process of examining some aspect of the school's goals and functioning as a group.*

The Relative Potency of Intervention and Context

The previous analyses have demonstrated that the combined intervention strategies that were utilized in the RDU program were more highly associated with school outcomes than was each strategy separately. A major objective of this chapter remains--to examine the relative importance of the intervention compared with the site characteristics on the school improvement outcomes (arrow 5, 6 and 7 together, compared with arrow 8 in the model). As described in Chapter 8, site characteristics were strongly associated with school outcomes. A first step in this analysis was to compare the explanatory utility of site characteristics and the combined intervention strategies. Table 9-8 indicates that for all but one outcome measure, the effects of the intervention outweigh site characteristics in accounting for variance in school outcomes. The biggest difference is in the adjusted R^2 for staff development outcomes (R^2 = .36 vs. R^2 = .16), followed by an effect on organizational changes (R^2 = .55 versus R^2 =.40). In other words, the spin-off effects of the program were most markedly affected by the intervention. Only process incorporation was equally affected by both the intervention and the site characteristics, and in each instance only 24% of the variance was explained by each category.

*In very few schools that we visited did we find administrators who were equally committed to preserving both the product and the process. In perhaps the most extreme case, the principal avowed that, in his inner-city school, the teachers should not incorporate any innovation permanently; part of his approach to avoiding "burn-out" was to interject innovation each year.

Table 9-8

PERCENTAGE OF VARIANCE IN OUTCOMES EXPLAINED BY COMBINED INTERVENTION STRATEGIES AND SCHOOL CHARACTERISTICS*

(N = 43)

Predictor Variables	Outcomes					
	Organizational Impacts	Product Incorporation	Process Incorporation	Problem Solved	Scope of Implementation	Personal Impacts
Combined Intervention Strategies	.55	.52	.24	.41	.43	.36
School Characteristics	.40	.45	.24	.34	.34	.16

*Adjusted multiple R^2.

Two additional analyses were conducted to determine whether site characteristics add to the ability of the intervention to account for school outcomes. Stepwise regressions were conducted of outcome measures on variables representing each component of the intervention (products, external human assistance, and internal problem-solving activities) and potent site characteristics. As Table 9-9 suggests, for all outcomes, explanatory power is increased when variables from all of the above components are considered. Eight variables explain 68% of the variance in organizational impacts, and once again process incorporation is the most elusive, with 29% of the variance explained. It is particularly interesting to note that for almost all of the outcomes, the variables contributing to the adjusted multiple R^2 are drawn from all the domains of the intervention (products, external assistance, and internal process) as well as site characteristics. The exceptions are the degree to which the problem was perceived as solved, in which no variable representing external human assistance entered at the point in which the selection was made, and process incorporation, where the explanatory variables represent only the internal problem-solving activities and site characteristics. In this analysis, no variables representing the external product characteristics or external human assistance contributed to the explanation of process incorporation. This analysis reinforces the previously stated interpretation that the intervention may not have successfully fostered process incorporation. Instead, the degree to which the outcome was achieved was largely a function of the internal processes (which were less influenced by the project than by the external features of the intervention), and the less manipulable site characteristics themselves.

The final and most stringent test of the relative power of intervention and site characteristics involved a block stepwise regression model. First, a selected number of site and problem context characteristics were entered in an initial block--in this case, teacher change orientation, problem focus on classroom organization, the index of disadvantagement, principal influence in the school and problem focus on pupil performance. The second step allowed unforced entry of the nine most powerful intervention variables. The purpose of this analysis was to determine whether, after the most powerful site and problem context explanations have "used up" the variance in the dependent variable, the intervention effects can still make a significant contribution.* The results of this heuristic "test" are presented in Table 9-10.

The major feature of this table is that <u>for all outcomes, intervention measures increase the multiple R^2 significantly over the contribution made by five important site characteristics</u>. Since this finding is replicated in other regressions using different combinations of external variables

*Because of our relatively small N, it is necessary to allow a limited number of site characteristics to enter in the first block in order to ensure that the degrees of freedom available for some intervention impact are preserved. Thus, the multiple R^2 do not correspond to some tables presented earlier. In order to ensure that the findings discussed here are not solely a function of the particular three site characteristics selected as the first block, additional combinations of site characteristics were used in other test runs. The findings are similar to those presented here, although the actual regression coefficients vary.

Table 9-9

STANDARDIZED STEPWISE REGRESSION (BETA)+ COEFFICIENTS
FOR THE RELATIONSHIP BETWEEN COMBINED INTERVENTION STRATEGIES AND SCHOOL CHARACTERISTICS AND
SIX MEASURES OF SCHOOL OUTCOMES
(N=49)

Predictor Variables	School Outcomes					
	Organizational Impacts	Product Incorporation	Process Incorporation	Problem Solved	Scope of Implementation	Personal Impacts
(Product)						
Product Quality		.18**		.43**	.14	.26**
Difficulty of Implementation					.20	
Product Complexity	.25			-.17		.20
Product Validated	.14					
(External Assistance)						
Agent/Principal Contact	.16**					
Agent Time on Site		.16*			.43**	-.33**
Amount of Training						
(Internal Problem-Solving Activities)						
Faculty Influence	.11*			.11		.09
Breadth of Involvement in Solution Selection			.20		.16	
Breadth of Involvement in Implementation	.21**	.37**	.25*	.21		
(School Characteristics)						
Teacher Change Orientation	.31**	.31**		.23		
Principal Influence	.27**		.19			
Prob. in Pupil Perf.		.27**	-.26*	.37**		
Prob. in Classroom Org.	.18*				.22*	.30**
Index of Disadvantagement						.20*
Multiple R^2	.73	.67	.35	.59	.60	.47
Adjusted Multiple R^2	.68	.63	.29	.53	.53	.40

+ Beta Coefficients are presently only for those variables which contributed to the reported multiple R^2. The selection process was stopped when additional variables failed to increase the Multiple R^2 by 1% or more; the order of entry was unforced.

* $p \leq .05$

** $p \leq .01$

Table 9-10

STANDARDIZED REGRESSION (BETA)+ COEFFICIENTS FOR THE RELATIONSHIP BETWEEN SITE CHARACTERISTICS (FORCED ENTRY), INTERVENTION VARIABLES (STEPWISE ENTRY) AND SIX MEASURES OF SCHOOL OUTCOMES (N=55)

Predictor Variables	School Outcomes					
	Organizational Impacts	Product Incorporation	Process Incorporation	Problem Solved	Scope of Implementation	Personal Impacts
(School Characteristics)						
Teacher Change Orientation	..27*	.24*	.21	-.05	.20	.09
Principal Influence	.07	.06	-.10	.17	-.17	.01
Prob. in Pupil Performance	.12	.28**	-.16	.40**	.17	.05
Prob. in Classroom Org.	.21*	.07	-.10	.02	.08	.31**
Index of Disadvantagement	.03	.03	.01	.09	.07	.20*
(Product)						
Product Quality		.18*		.38**		.28**
Product Complexity	.23**		-.17		.15	.19
Product Validated						
(External Assistance)						
Amount of Training						
Agent Time on Site		.12		-.19	.25*	-.34**
Agent/Principal Contact						
(Internal Problem-Solving Activities)						
Faculty Influence	.15**			.12*		.11
Breadth of Involvement in Solution Selection			.22		.14	
Breadth of Involvement in Implementation	.28**	.38**	.24*	.20*	.21	
Multiple R^2	.29	.28	.01	.23	.18	.15
Adjusted Multiple R^2	.58	.62	.17	.50	.43	.39

+ Beta Coefficients are presently only for those variables which contributed to the reported multiple R^2. The selection process was stopped when additional variables failed to increase the Multiple R^2 by 1% or more.

* $p \leq .05$

** $p \leq .01$

(not tabled), it suggests that the interventions made a major contribution to school improvement outcomes over and above the site characteristics.

We would caution against any major interpretation of the regression coefficients within this table because of the forced entry of a limited number of variables, not all of which are significant. However, it is also interesting to note that, while many of the coefficients are not significant, measures from all three components of the RDU intervention enter each regression. This again supports our previous argument that people, process and products are combined to produce effective knowledge utilization and school improvement.

SUMMARY AND CONCLUSION

Because the set of questions and findings presented in this chapter is relatively diverse, a brief summary is appropriate:

- Site characteristics and external technical assistance are moderately good predictors of the internal problem-solving process. Site characteristics tend to be more powerful in determining the process, with the exception of the "problem-solving quality," which is strongly affected by the role of the external field agent, and the degree to which the agent adopts an innovative orientation.

- The quality and characteristics of the internal problem-solving process are of limited value in explaining the degree to which a high quality, validated product requiring a broad scope of change is selected. Our analysis revealed, however, that insofar as the process was important, it appeared to be a result of the activity of two potential "internal change agents"--the principal and central office specialists.

- The project design and management appear to account for significant differences in the type of products selected, and the type of technical assistance services delivered to schools.

- When the three components of the RDU intervention are examined together, it is the combined strategy rather than any element, which accounts for school improvement outcomes. The combined strategies appear to outweigh the importance of school characteristics in predicting school improvement outcomes.

These findings bear very directly upon the question that was posed at the beginning of the chapter: What is the potency of the managed approach to change versus one which emphasizes the impact of "natural systems" activities and other non-controllable events? There are a number of observations that we may make, based upon the above results and findings emerging from other parts of this study (Louis, Kell, Chabotar and Sieber, 1981).

First, the notion that change is managed and/or manageable must be distinguished from the notion that it is predictable. We know, for example, that in a given multi-year change program a variety of critical events will occur. However, these events cannot be managed, in that the school administrator, teacher or planner cannot predict when they will occur, nor the ways in which they will affect an ongoing change program. Similarly, a principal may know that teachers' orientation to change is one of the best predictors of the program's implementation and persistence--but s/he may have very limited ability to select staff for a positive change orientation under conditions of educational cutbacks, and may also have limited resources to attempt to alter the staff's orientation to change. S/he can, therefore, predict whether the school is a likely candidate for a school improvement program, but s/he cannot alter that aspect of the school.*

When we examine the nature of the intervention and the change process it is typically believed that we are dealing with issues that are open to management and are affected by human decisions. Our data support that notion in fairly substantial ways, and allow us to refine some of the current theories about change management. For example, we can, on the basis of our data, go beyond the aphorism that the principal's role in the change process is important. Our data suggest that the principal may, under typical circumstances in normal, "unexceptional" schools, play a special role of quality control over what is adopted and implemented, and how its coherence and form are maintained in the classroom. Again, in the typical school, where the principal is not necessarily a dynamic instructional leader, the principal who acts as a "change agent" has an indirect, facilitative impact upon the change process and its outcomes (see Firestone and Herriott, 1980). We also find that similar roles can be played by central office staff members, who can take on active "change agent" roles which involve facilitating more than decision making.

Further, we find little evidence to support the notion that the world of implementation and school change is a chaotic one. Rather, our data suggest that, while what happens in schools may not directly correspond to what program designers intend, there are consistent patterns of differences between projects that suggest that school-based intervention programs can be managed at the state and perhaps even federal level.

Most important, however, is the finding that a complex federally initiated and field-designed program that is implemented at the local school level was able to provide services which appear to at least partially equalize innate differences in "innovativeness" among schools. This suggests very strongly that, although RDU was unquestionably a relatively primitive tool (particularly when compared to intensive and expensive approaches to long-term organization development interventions, or extensive developer-adopter relationships as exemplified by the federally funded Follow Through program), some impacts in both capacity building and knowledge use can be achieved.

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*Even the development of contingency plans may be quite difficult, except in cases of the most major predictable events. For example, it is likely that an administrator can estimate the probability of a teachers' strike in any given year and decide whether s/he should make contingency plans around this. However, it may be wasteful to develop contingency plans around the possibility of each teacher staying or leaving.

We have also learned that the design of interventions to produce knowledge utilization and school improvement must recognize, in the delivery of actual services, the extensive support needs of schools. The decision-making and implementation process in schools is invariably a complex one, which takes a great deal of time and, if it is to work effectively, may require the involvement of many participants at different stages in the process. While each of the RDU strategies described above were found to affect school outcomes positively, it is the combination of the strategies that most effectively predicts knowledge use and school improvement. The RDU experience suggests that for a dissemination strategy to be effective, it is important to support many activities: the development of innovative, validated products in a wide variety of curriculum areas that are well packaged, transportable and incorporate training assistance; the support of reasonably intensive external human assistants to initiate and facilitate problem solving, and provide technical assistance and training; and the support of local participation in the problem-solving process to ensure local ownership, relevance to local needs, and a potential capacity building within districts to engage in ongoing problem-solving activities. This combination of external intervention and internal problem solving significantly increases successful school improvement activities at the local level.

The data further suggest that the impacts of any one of the components of the RDU intervention discussed above cannot be interpreted except in the light of the potency of the other components of the intervention. Thus, for example, the finding that extensive local adaptation and local materials development does not promote school improvement seems to occur because the faculties that successfully implemented new practices went through a detailed problem-solving process. In this process they carefully clarified their real curriculum needs, were guided by external field agents through a process of matching these needs to the characteristics of selected potential innovative practices, and, once having selected a solution, were able to transmit their enthusiasm to the whole faculty. Because the solution actually matched a felt need reasonably well, gross adaptations were typically not necesary. A "sense of ownership," which is often found to be related to incorporation of new practices, was developed through faculty involvement in the decision-making process, and not through participation in local materials development or classroom-level adaptation.

In summary, in order for an R&D-based approach to school improvement to work effectively, it is necessary to have several minimal conditions occurring simultaneously. First, relevant products of high quality must be available on a relatively easy and continuous basis. Third, the process of selecting and implementing a new practice must involve a locally driven scheme which is dominated by high levels of faculty involvement, strong support from administrators in the school and district, and adheres at least minimally to principles of sound problem-solving.

While our findings make a needed contribution to the understanding of the degree to which managed change programs can affect schools, it is important not to overestimate what has been reported in this chapter. Some of our results are disappointing. The data do not, for example, illuminate very effectively how external agencies can produce the effective internal

strategies or the choice of good products. We found that the external technical assistance provided by field agents and trainers was not especially powerful in determining the nature of the problem-solving process used within the school (with the exception of the overall rationality or quality of the problem-solving behaviors). Similarly, measures of the problem-solving process (which, presumably, could indicate strategies for change management) were not very good predictors of the product choices made by the schools. Thus, while we now know that certain types of technical assistance seem to produce desirable school outcomes, the data also provide support for theories of organizational change and decision making which suggest that the management of behavior associated with the change process is problematic, at best.

Our analysis has left us with only a partial resolution of the dilemma that was posed at its beginning. It has provided clear support for the general conclusion that a well-designed intervention can have an impact on school improvement and knowledge utilization independent of system characteristics. At the same time, however, it is still unclear how and why the potential impact of the intervention becomes translated into a set of choices at the school level which, in turn, produce the desired impacts. One factor that we have not explored, but which is frequently looked to as a constraint on school behavior, is the cost of adopting and implementing a new program. It is to this issue that we now turn.

CHAPTER 10

COSTS OF PARTICIPATION IN THE RDU PROGRAM*

INTRODUCTION

While the emphasis of the RDU study is on the process and outcomes of rational problem solving in schools, it is also important to consider how much these activities cost. Every organization, whether privately owned or governmental, has limited resources at its disposal. Schools especially are faced with increasing fiscal constraints brought about by declining enrollments and taxpayer revolts. Thus most decisions in the RDU program and other educational improvement efforts necessarily involve either implicit or explicit comparisons of the programs' anticipated costs to their realized or expected benefits. The willingness of principals and teachers to undertake planned educational change is likely to be affected as much by the anticipated costs of a proposed change as by its perceived quality, relevance, or reputation.

This chapter presents the results of our cost analysis of the RDU program. It reviews the objectives and methodology of the cost study, describes its data collection strategies and activities, and analyzes the resultant cost information by RDU project, stage of the problem-solving process, and other dimensions. In addition, it exposes the relationship of site costs to site processes and outcomes. Finally, it suggests the significance of these findings within the context of the RDU program and within the context of future efforts to increase the use of R&D products in schools.

Definition of Cost

Cost accounting, the principal concern of this chapter, can be broadly defined as the process of determining the cost of a product, a service or a program. But what is a cost? An error commonly made by educators and others is to confuse "expenditures" with "costs" and thus erroneously view total or per unit expenditures as equivalent to total or per unit costs of a product or service. However, expenditures reflect only budgeted or actual cash disbursements for specific items that the school or other organization needs to operate (e.g., personnel time, equipment, travel, etc.). They are essentially a record of input that can be uncovered by a review of budgeting or accounting records at the school or district level.

Costs, on the other hand, are primarily concerned with output or with the personnel and nonpersonnel resources actually used in providing a service or supporting a function (e.g., group brainstorming, materials development, research, etc.). Costs are also more inclusive than expenditures since they include not only direct cash outlay but also in-kind and indirect costs:

- Direct costs can be readily identified with specific RDU activities and paid for directly with RDU grant funds;

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*This chapter was written by Kent John Chabotar and Jane Sjogren.

- In-kind costs can be readily identified with specific RDU activities but are not charged to an RDU grant. In-kind costs are incurred when Title IV-C, NDN, district accounts, and other non-RDU sources provide resources to the RDU effort, or when teachers and administrators contribute their time to RDU without being compensated directly by RDU program funds; and

- Indirect costs are incurred for an RDU activity but are of a type that cannot be readily identified with the specific activity, e.g., the district's accounting office maintains financial records which are used by the RDU program as well as by other administrative, instructional, and support programs. These costs may or may not be charged to the RDU grant.

By this definition, costs represent the value of all resources actually used, including those which are not usually reflected in grant awards or organizational budgets. Thus, this analysis of RDU costs entails not only an accumulation of regularly documented expenditures or budgets but also a painstaking search for less accessible cost data through interviews with participants, reviews of project or site files, and other sources.

We use this broad definition of costs not only because it describes "real" costs in terms of resource use, but also because other studies of change in educational organizations, such as Berman and McLaughlin (1977), note the importance of "hidden" operating costs and their impact on the maintenance of federally sponsored change.

Objectives of the Cost Analysis

Applying this definition of costs to the RDU program not only identifies the "real" costs of the program, both hidden and visible, but also provides information which can be used to assist practitioners when they compare the anticipated costs and benefits of alternative school improvement strategies. In addition, it can inform the program's sponsors about how federal funds were used in participating schools and whether these funds stimulated any local contributions of time or money to the RDU effort. With respect to other aspects of the RDU study, cost may explain some of the variation in program impact, institutionalization of the R&D product and problem-solving process, and other measures of RDU program "success." In light of these considerations, the cost study was designed to respond to the following questions:

- What types and amounts of federal and local resources are used at the site level and how do these vary by project?

- How are costs related to the various processes through which innovation occurs, e.g., problem identification, group brainstorming, etc.?

- What use of in-kind or indirect resources is made at the site level and what policy implications does the use of in-kind resources have?

- What information about resource use and costs may be most useful to state and local practitioners when planning for innovation?

To answer these questions, we collected data about different types of costs at various levels of the RDU program with an emphasis on site-level costs. First, costs are divided between personnel costs (e.g., teacher time, consultant time, etc.) and nonpersonnel costs (e.g., R&D products, travel, audio-visual equipment, etc.). Second, personnel and nonpersonnel costs are further disaggregated into direct, in-kind, and indirect costs.

Once identified, these six types of costs are distributed among the stages of the RDU problem-solving process (i.e., problem identification, solution selection, and planning for implementation/implementation) and within each stage among specific RDU activities (e.g., group brainstorming, training, administration, research, and materials development). Site-level costs are then grouped by RDU project in order to determine the impact on costs of different approaches to knowledge utilization and problem solving in schools. Finally, cost information derived from a site-level analysis must be added to costs identified through separate analyses of field agent activities, project-level tasks, and NIE's overall responsibility for RDU program management. This enables us to obtain a rough "bottom line" cost for the entire RDU program. The relationships among these "cost centers" are depicted in Figure 10-1.

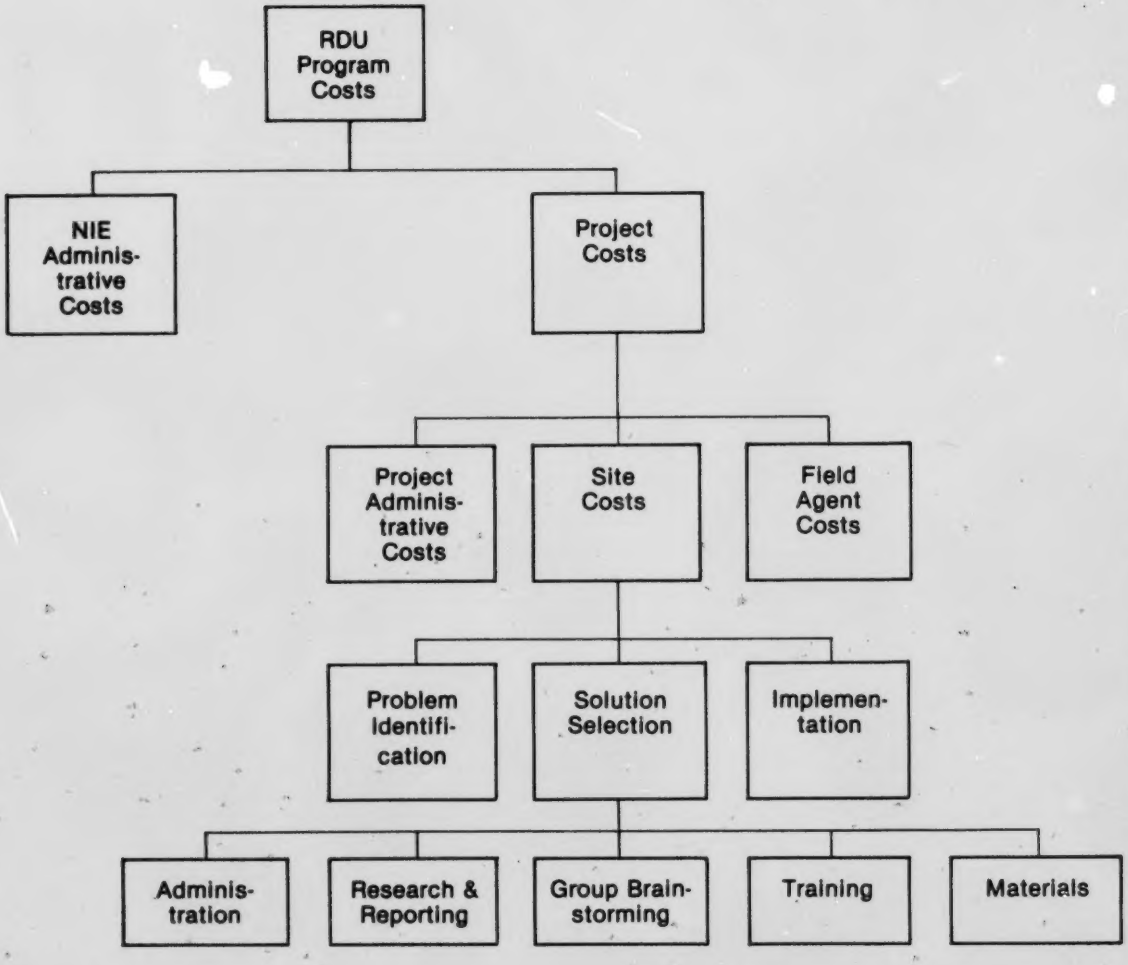
METHODOLOGY

Like the RDU program itself, the cost study had to make the most efficient use possible of limited time and money to meet its objectives. Certain priorities were established at the start which focused the study on personnel costs at the site level. Because the RDU problem-solving process is characterized by the participation of teachers, administrators and other personnel, the distribution of personnel time is the single most important factor in determining the composition and magnitude of costs at the site level. Particular attention is focused on site-level costs because this is ultimately where the implementation of R&D products and the problem-solving process takes place. Personnel and nonpersonnel costs at the NIE, project, and field agent levels were also collected. These are based on readily available records rather than on the intensive interviews and searches that characterized the site-level analysis. Thus, our discussion of methodology is divided into two sections: site-level costs and other costs.

Site-Level Costs

In order to estimate site costs and to make data collection efficient and reasonable in scope, we devised a multi-phase procedure. The objective was to use full cost data collected from a sample of sites to develop standard ratios for personnel and nonpersonnel costs and for direct and in-kind

Figure 10-1
Cost Incidence in RDU Program



costs. These ratios could then be used to extrapolate full costs for all sites based on the information on personnel use collected by the survey of principals. The phases were as follows.

Phase 1. For the first phase, detailed data about all types of costs (personnel and nonpersonnel as well as direct, in-kind, and indirect) were collected in three generally representative sites. In February-March 1979, three sites were visited that offered a range of projects and types of services (basic skills, career education, and inservice), that had been visited previously by AAI staff, and that had completely implemented their selected R&D products. At each site, the project coordinator, teachers, and other school or district staff were interviewed in order to identify the distribution and use of specific types of resources during the course of the site's RDU participation. Personnel costs were determined by the staff member's annual salary multiplied by the percentage FTE (full time equivalent) devoted to RDU stages and activities. Indirect costs were calculated using the site's audited indirect cost rate as established by its state department of education. All other costs were derived from site records. From these data, preliminary estimates of the ratios between direct/in-kind costs and personnel/nonpersonnel costs were developed. The data collected revealed that personnel costs accounted for over 80% of total costs. This affirmed the relative importance of personnel costs and also allowed a focus on personnel costs in the second phase.

Phase 2. The second phase of data collection was based on site visits to 23 sites in the Winter of 1980. Interview agendas were used to collect somewhat less detailed information about various forms of resources used, especially personnel resources, and this information was verified from project records. Data from these sites (representing all seven RDU projects) were used to form estimates of site-level costs and to develop ratios of personnel/nonpersonnel costs and direct/in-kind costs, as well as estimates of total costs by site.*

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*A third phase involved a question on the Principal Survey received by all principals in the RDU program. It focused on personnel resources used over the duration of the school's RDU involvement (i.e., how many person days were spent by participants on each RDU stage). This information and the ratios developed in the preceding phase were supposed to be used to form cost estimates for all sites. For example, a 5 to 1 ratio of personnel to nonpersonnel derived in Phase 2 would allow the extrapolation of $5 worth of personnel time reported in the Phase 3 survey to include an additional $1 in nonpersonnel costs.

However, the cost analysis in this chapter had to be confined to the 23 sites in Phase 2 because both the response rate and the quality of the data from the survey were disappointing. The response rate on the cost question (for complete and usable data) was only 27%, although the overall questionnaire response was 76%. In addition, there were instances in which the time estimates noted in the survey were significantly different from the estimates gathered by our staff during the Phase 2 site visits to the same sites. There may be two reasons for the disappointing quality of these data: (1) high principal turnover meant that the survey respondent may not have been

Other Costs

The cost study emphasizes site-level costs. However, in an attempt to estimate a rough "bottom line" cost for the entire RDU program, the costs of RDU activities at other levels have also been estimated.

- Field agent costs were confined to personnel costs based on average salary figures supplied by NIE and %FTE time commitments reported by field agents.

- Project management costs were the seven projects' NIE grants minus funds distributed to the sites and field agents plus an allowance of 10% for in-kind contributions.

- NIE management costs were reported by NIE for personnel time and travel.

This information makes it possible to aggregate cost data across levels to estimate total RDU program costs with the understanding that such an estimate has several limitations. First, while the site-level analysis includes all types of costs, the analysis at other levels involves mainly personnel costs. Second, the aggregation of four separate cost studies within the same program necessarily risks some double-counting of federal funds which can only be avoided by an expensive and time-consuming effort to develop and apply mutually exclusive cost categories. Third, any total cost figure pertains mainly to the RDU program since many of the costs revealed in the analysis are idiosyncratic of the ways in which the seven RDU projects were developed and operated.

DATA COLLECTION AND ANALYSIS AT THE SITE LEVEL

In concert with regular data collection activities at the site level for the overall RDU study, three sets of activities were undertaken to collect site-level cost data. These activities occurred before, during and after the visits to each site.

Prior to the site visits, the principal or another "principal informant" was informed of the purpose and nature of the visit, and was asked to collect information on major RDU activities and participants. Interview time was requested with selected participants to verify the principal in-

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at the school for all or part of the RDU program (some respondents noted that this was the case); and (2) the cost item which requested a fairly detailed response and familiarity with the operation of the project was the last item on the survey, and thus respondent fatigue may account for the haphazard or missing responses to this item. Because of these considerations, the survey data were used to supplement the cost data from the site visits instead of relying on the survey as heavily as originally planned. The site visit data were much more reliable since they were collected by trained researchers, were distributed among all seven projects, and had, in most instances, been verified by the project files.

formant's recollections, and with the school district's fiscal officer to determine direct nonpersonnel and indirect costs of the RDU effort at the site.

As the first respondent, the principal informant conveyed information on the range of costs incurred by the site during its RDU involvement. For personnel costs, the informant was asked about: (1) length of each RDU stage; (2) participants in each stage and their average salaries; (3) number of days in each participant's work-year so that a daily rate could be established; and (4) number of person-days expended by each participant on RDU activities (e.g., materials development, training, etc.) during each stage. Subsequent interviews with selected participants permitted refinements in the person-day estimates originally made by the principal informant. Using the dates of each RDU stage, the district fiscal officer provided the major expenses during each period for RDU-related travel, R&D products, release time, equipment rental, and other items. The officer also noted whether or not an expense was charged to the RDU grant, thus enabling us to distinguish between direct and in-kind costs. With respect to indirect costs, it was discovered that audited indirect cost rates existed for all sites (generally 2-4% of direct personnel costs) which enabled us to avoid the manual calculation of indirect costs.

The detailed data collected through the site visits and project files were analyzed in order to establish full costs for each site which would later be combined with cost data from other sites to establish average costs by project for RDU activities and stages. Estimating nonpersonnel costs was fairly straightforward since the date and amount of each expenditure and the dates of each stage had been determined during the site visit. Indirect costs were also easy to estimate by applying the audited indirect cost rate. The process for determining direct and in-kind personnel costs was more complicated, as indicated in Table 10-1. Costs are a function of the participants' daily rates (e.g., $100) multiplied by the number of person-days invested in each stage (e.g., 5) which yields full costs for that stage (e.g., $500). Full costs less direct costs charged to the RDU grant equals in-kind costs, most of which consisted of uncompensated staff time spent on RDU activities.

COST RESULTS

Cost data are presented for three levels: (1) site costs; (2) other costs; and (3) total RDU program costs. Primary attention was given to site-level costs because these data constitute the original focus of the cost study. In addition, they are the most reliable because they were collected at the site by trained project staff. Other costs are the personnel costs of the field agents and the management costs of the projects and NIE. All of these are included in the estimation of total program costs.

Site-Level Costs

Site-level costs of the RDU project included: average total site costs by project and stage; average ratio of in-kind to direct costs by project; and average ratio of personnel to nonpersonnel costs by project.

TABLE 10-1
A Sample Calculation of Site Personnel Costs

STAFF TYPE	AVERAGE ANNUAL SALARY (all sources)	DAYS WORKED PER YEAR	DAILY RATE $	PROBLEM IDENTIFICATION 9 77 Month/Year to 11 77 Month/Year					SOLUTION SELECTION 12 77 Month/Year to 5 78 Month/Year					SOLUTION IMPLEMENTATION* 6 78 Month/Year to 5 79 Month/Year							
				Project Management	Group Brainstorming and Decision-Making	Training and Technical Assistance	Materials Development	Evaluation and Documentation	Project Management	Group Brainstorming and Decision-Making	Training and Technical Assistance	Materials Development	Evaluation and Documentation	Project Management	Group Brainstorming and Decision-Making	Training and Technical Assistance	Materials Development	Evaluation and Documentation	Total Costs	Less Direct Costs Charged to RDU Grant	Equal In-kind Costs
Superintendent	50,000	250	200	1		($200)**			1		($200)			1		($200)**			600	0	600
Principal	25,000	220	115	1	2	($460)		1	1	2	($460)		1	2	6	($1035)		1	1955	0	1955
Teachers	18,000	180	100		10	5 ($1700)		2		10	5 ($1700)		2		30	10 ($5200)	10	2	8600	1100	7500
Consultants	NA	NA	150													5 ($750)			750	750	0
Other: _____																			–	–	–
				$2360					$2360					$7185					$11,905	$1850	$10,055

*Includes planning for implementation

**Rate x Person-days = cost by stage
$200 x 1 = $200

In addition, average total site costs and the number of sites in each project can be used to estimate a total site cost for that project. These totals are carried forward into the next section on other costs as a rough "bottom line" for the entire RDU program is formulated.

Average Total Site Costs by Project and Stage

Table 10-2 displays site costs for each RDU project and reports them by RDU stage (Stage 1 - Problem Identification; Stage 2 - Solution Selection; Stage 3 - Planning and Implementation). It also indicates the approximate amount of calendar time for each stage.* The dollar figures represent the estimated total costs for all resources (personnel and non-personnel) used in the individual sites. (In other words, they include both direct and in-kind costs.) Duration of the projects ranged from approximately 18 to 33 months, and averaged about 23 months. There was a fairly wide range in the total average estimated costs, from approximately $12,000 in the NEA sites to approximately $39,000 in Georgia. These extremes are not surprising given NEA's limited focus on inservice programs and Georgia's emphasis on local action teams of 50 or more members which consumed large amounts of personnel time.

In nearly all the projects, planning and implementation activities took the largest amount of time and represented the largest share of total costs. This emphasis was particularly true at NRC and NETWORK sites which spent an average of about 77% of their resources on planning and implementation, due largely to product expenses and broad staff participation in group brainstorming and materials development. Solution selection was usually the shortest and least costly stage, sometimes because the site already had a product in mind when it entered the RDU program, but more often because a field agent or principal successfully advocated a particular product before a full search had been made. Pennsylvania and Michigan had unusually high resource use during their problem identification stage. This can be explained in part by a complex problem-solving process in the former case, and by a lack of external support in the latter case as a result of field agent work overload and late project start-up.

Average Ratio of In-Kind to Direct Costs by Project

Comparisons between in-kind and direct costs suggest the level of commitment that a site has to the RDU program. This is true because in-kind costs represent local contributions of time or money while direct costs are charged against the RDU grant. Table 10-3 presents the average ratios of in-kind to direct costs across the sites of each RDU project.

The table reveals that in-kind costs were a much larger share of estimated total costs than were direct costs. For the projects as a whole, the average ratio of in-kind to direct costs was 4:1; thus in-kind costs accounted for 80% of total costs. In-kind costs were incurred in many ways, primarily through the time spent by teachers and principals on RDU activities that was not covered by RDU funds (e.g., group brainstorming and materials development). Some release-time money was paid to participating teachers from the RDU grant or district funds; for the most part, however,

*The cut-off point for the planning and implementation stage was set at one year following product implementation or at the end date of the project, whichever came first.

Table 10-2

RDU PROJECT COSTS AT SITE LEVEL:
AVERAGE DURATION AND COSTS BY PROJECT

PROJECT	Mean Duration by Stage* (Months)				Mean Costs by Stage* (Total $)			
	Stage 1	Stage 2	Stage 3	Total	Stage 1	Stage 2	Stage 3	TOTAL
NRC (2 sites)	6.5	5.5	10.5	22.5	$4,005	$3,192	$24,515	$31,712
Georgia (4 sites)	3.6	4.0	13.3	20.9	3,055	8,135	18,609	29,799
Pennsylvania (2 sites)	9.5	4.5	10.0	24.0	7,312	3,244	17,522	28,078
NETWORK (5 sites)	9.5	4.2	19.6	33.3	2,578	3,260	21,088	26,926
NEA (3 sites)	6.2	2.0	13.0	21.2	3,884	1,393	6,857	12,134
Florida (5 sites)	6.0	4.6	13.0	23.6	3,761	3,914	10,252	17,927
Michigan (2 sites)	6.0	9.0	3.0	18.0	9,760	6,786	7,791	24,337
GRAND MEAN X	6.8	4.8	11.8	23.4	$4,908	$4,275	$15,233	$24,416
(Mean % of TOTAL)	(29%)	(20%)	(50%)	(100%)	(20%)	(17%)	(62%)	(100%)

* Stage 1: Problem Identification
Stage 2: Solution Selection
Stage 3: Solution Implementation (including planning for implementation)

Table 10-3

AVERAGE RATIOS OF IN-KIND TO DIRECT COSTS
(Across Sites Within Projects)

PROJECT	In-Kind to Direct Cost Ratio (In-Kind:Direct)
NRC	3.6:1
Georgia	4.8:1
Pennsylvania	7.5:1
NETWORK	4.1:1
NEA	4.8:1
Florida	3.5:1
Michigan	2.0:1
Total for All Projects (Grand Mean)	4.0:1

the time was contributed to the program without charge. Other sources of in-kind costs were the time spent by school or district staff on project fiscal management or reporting, free use of district duplicating facilities, provision of district funds for travel and tuition, and time spent by non-school personnel (especially parents) on RDU activities. Direct costs were largely created by charges against the RDU grant for release time and R&D products.

There were considerable differences among projects in the ratios of in-kind to direct costs. Michigan, for example, only generated $2.00 in in-kind costs for each $1.00 of direct costs charged to the RDU grant. This low ratio is attributable in part to the exceptionally large RDU grants available to each Michigan site (over $8,000). This meant that although Michigan's in-kind contributions were comparable to other projects (about $16,000), its ratio of in-kind to direct costs was relatively low. On the other hand, high ratios were reported by NEA (4.8:1) and by Pennsylvania (7.5:1). In both cases this was mainly the result of low RDU funding per site (about $2,000-$3,000) rather than unusually high commitments of local resources. (Another factor behind Pennsylvania's high ratio was the significant amount of uncompensated staff time required to undertake its complex decison-making process.)

It is notable that there was no apparent relationship between direct costs (in terms of RDU funding per site) and total site costs. Michigan's large RDU grants of $8,000 per site yielded an average of $24,337 in total costs (see Table 10-2); Pennsylvania's total costs were $28,078 even though its sites received an average RDU grant of only about $3,000. The relationship between direct costs and total costs is also not an inverse one--large RDU grants are not associated with low total costs, and vice versa. NEA, for example, only allocated $2,000 per site in RDU funds and had the lowest total costs, averaging $12,134 per site.

Average Ratio of Personnel to Nonpersonnel Costs

Typically, personnel costs account for most of the costs of service-oriented programs. It was expected that up to 85% of the total costs of the RDU program at the site level would be due to personnel costs. Table 10-4 reveals that, as anticipated, the estimated value of the personnel time spent on project activities far outweighed the costs of nonpersonnel resource use. On the average, RDU sites incurred $3.80 in personnel costs for each $1 of nonpersonnel costs, indicating that personnel costs accounted for 79% of total average costs.

Most personnel costs were due to the time spent on RDU-related activities by principals, teachers, and other participants. Group brainstorming and materials development by local action teams prompted the largest time investments, although the time required for training and evaluation was less significant. Many sites used external consultants for training and technical assistance activities, adding another source of personnel costs. Nonpersonnel costs were incurred mostly for travel to observe the use of R&D products at other schools and for purchase of R&D products and supplementary materials.

Table 10-4

AVERAGE RATIOS OF PERSONNEL TO NONPERSONNEL COSTS
(Across Sites Within Projects)

PROJECT	Personnel to Nonpersonnel Cost Ratio (Personnel:Nonpersonnel)
NRC	5.9:1
Georgia	4.9:1
Pennsylvania	9.6:1
NETWORK	3.6:1
NEA	14.0:1
Florida	1.9:1
Michigan	2.2:1
Total for All Projects (Grand Mean)	3.8:1

Although personnel time was the largest item in all sites, the ratio of personnel to nonpersonnel costs varied considerably across the projects. NEA's particularly high ratio of personnel to nonpersonnel costs (14:1) was in part attributable to its emphasis on inservice training. This emphasis entailed high personnel costs for teacher time and consultant instructional fees and low nonpersonnel costs due to inexpensive products and minimal travel to compare alternative solutions. The complex problem-solving process used in Pennsylvania consumed substantial amounts of staff time and led to its high ratio of personnel to nonpersonnel costs (9.6:1). At the other extreme, the low ratio for projects in Michigan (2.2:1) is attributable in part to the low time investments in solution implementation since Michigan sites tended to involve fewer teachers at this stage than in other projects and thus consumed less time as well. In Florida, the ratio of personnel to nonpersonnel costs was also low (1.9:1), largely because Florida projects relied on from one to three specially-trained site facilitators rather than on broadbased decision-making teams. This project thus used less personnel time overall.

Total Site Costs

To estimate the total costs incurred at the site level by project, the average site cost was multiplied by the number of sites in each project. For example, if the five sites in Project X that were included in the cost study reported an average total site cost of $25,000 and Project X has a total of 50 sites, then the total site cost for that project would be $1,250,000. Table 10-5 contains the results of applying such a formula to the RDU projects. It also provides dollar equivalents for the ratios between (1) in-kind vs. direct costs and (2) personnel vs. nonpersonnel costs.

Total site costs ranged from a high of $1.14 million in NRC to a low of $365,014 in Pennsylvania. These differences were due more to the number of sites in each project than to the average cost per site; NRC and Pennsylvania had very similar average site costs ($31,712 vs. $28,078) though they had a wide disparity in the number of sites served (36 vs. 13). The impact of a large number of sites on total site costs for the project was also demonstrated in Georgia and Michigan.

The sum of the individual project totals is $5,744,544. This figure represents the estimated total costs of all site-level activities across all seven RDU projects.

Other Costs

The scope of the cost analysis can be expanded to consider costs incurred at other levels of the RDU program. This expansion is not intended to account for the full costs of the RDU program, but only to include major elements of non-site costs in estimating the "bottom line" costs of the program. Three non-site costs were considered: (1) field agent costs; (2) project management costs; and (3) NIE management costs.

Table 10-5

ESTIMATED TOTAL SITE COSTS BY PROJECT

PROJECT	Average Site Cost	Number of Sites	Total Site Costs by Project	In-Kind vs. Direct Costs*			Personnel vs. Nonpersonnel		
				Ratio	In-Kind	Direct	Ratio	Personnel	Nonpersonnel
NRC	$31,712	36	$1,141,632	3.6:1	$ 857,713	$ 238,254	5.9:1	$ 976,178	$ 165,454
Georgia	29,799	38	1,132,362	4.8:1	899,642	187,425	4.9:1	940,436	191,926
Pennsylvania	28,078	13	365,014	7.5:1	309,188	41,225	9.6:1	330,579	34,435
NETWORK	26,926	29	780,854	4.1:1	602,636	146,984	3.6:1	611,103	169,751
NEA	12,134	55	667,370	4.8:1	530,214	110,461	14.0:1	622,879	44,491
Florida	17,927	30	537,810	3:5:1	401,565	114,733	1.9:1	352,358	185,451
Michigan	24,337	46	1,119,502	2.0:1	716,481	358,241	2.2:1	769,658	349,844
TOTALS	23,942	247	$5,744,544		$4,317,439	$1,197,323		$4,608,239	$1,136,302

* Excludes allowance for indirect costs

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Field Agent Costs

Estimates of field agent costs were confined to personnel costs for two reasons. First, personnel costs account for up to 85% of total costs of RDU activities, including those undertaken by field agents. Second, the cost to the RDU study of capturing the remaining nonpersonnel costs, other than those at the site level, would have been exceeded by the value of the information, especially when they were a small proportion (approximately 15%) of total costs.

Field agent personnel costs were a function of their average annual salaries and the number of person-years that the field agents in each project spent on RDU activities. NIE data were used to estimate an average field agent salary of about $20,000 per year (including fringe benefits). The number of person-years committed to the RDU program was estimated from data from a survey of agents in which each field agent reported the %FTE spent on RDU activities in a typical project year. When the %FTE reported were summed across agents in a project and multiplied by the duration of the average RDU project, the approximate number of person-years spent by that project's field agents on the RDU program was obtained. This formula is shown below:

Field Agent Personnel Costs	=	Average Annual Salary	x	%FTE reported by Agents	x	Duration of Project

Table 10-6 shows the results of applying this formula to estimate field agent costs for the RDU projects. It reveals total agent personnel costs of approximately $1,626,000. The reported number of person-years varied greatly across projects and, consequently, so did the total personnel costs for field agents. Projects which used full-time field agents with a substantial commitment to "hands-on" training and technical assistance at the site level tended to report more person-years for their field agents than projects which relied on part-time agents and a knowledge base that could be accessed by local problem-solving teams without extensive external assistance.

Project Management Costs

Project management costs include the costs associated with compilation and use of the knowledge base, training and technical assistance agencies, field agent travel and other nonpersonnel expenses, project conferences, salaries of headquarters staff, and other costs involved in operating the project above the site level. These costs were estimated as each project's NIE grant, less the funds distributed to the sites (which are direct costs at the site level charged against the RDU/NIE grant), less the personnel costs of the field agents, and plus a small allowance for the project's in-kind contributions to the RDU effort. This formula is restated below and was applied to the seven RDU projects.

Project Management Costs	=	RDU Grant	-	Total Direct Costs at Site Level	-	Field Agent Personnel Costs	+	10% Allowance for In-Kind Contributions

Table 10-6

ESTIMATED FIELD AGENT PERSONNEL COSTS

PROJECT	Average Annual Salary	Number of Person Years	Total Personnel Costs
NRC	$20,000	12.0	$ 240,000
Georgia	20,000	14.1	282,000
Pennsylvania	20,000	5.7	114,000
NETWORK	20,000	16.5	330,000
NEA	20,000	7.8	156,000
Florida	20,000	15.6	312,000
Michigan	20,000	9.6	192,000
		TOTAL	$1,626,000

As shown in Table 10-7, Georgia's project management costs were substantially lower than those in other projects, reflecting Georgia's smaller NIE grant, its relatively large amount of grants to sites, and its substantial field agent costs. NRC and Michigan also allocated sizeable portions of their NIE funds to their sites. The remaining projects used larger portions of their funds both to centralize training and technical assistance functions and to adapt knowledge bases to their sites' needs. Total project management costs were $6,081,547.

NIE Management Costs

The estimated total costs of the RDU projects must include the costs incurred by NIE in planning, developing, monitoring, and closing out the program. The NIE-level costs began in FY 1977 and continued through FY 1980.

Like most of the other activities of the RDU program, NIE relied heavily on the use of personnel time. As shown in Table 10-8, NIE's administrative costs of $478,600 involved the costs of a program director, monitors, a secretary, and consultants, as well as some travel costs. While there were some other costs to NIE, such as overhead and support services, these were relatively minor in both size and importance.

Unlike some of the other costs of the RDU program, NIE's costs were purely administrative. In addition, because NIE was responsible for establishing the program and overseeing its operation, certain of these costs were "one-time" costs. That is, they would not be recurring if a program like the RDU program was established on a permanent basis.

Estimated Total RDU Program Costs

A rough estimate of the total costs of the RDU program includes the sum of costs incurred at the individual sites, field agent personnel costs, project management costs, and NIE management costs. In aggregating these costs, it is important to note that they were incurred during the period between 1976 and 1979 and that the figures upon which these estimates were constructed are based on actual resource prices during that period. As shown in Table 10-9 estimated total costs for the RDU program were approximately $15,890,495. Federal expenditures for the RDU program constituted 53% of this total or about $8,352,000.

The estimate of the total costs of the RDU program can be further refined by subtracting the estimated costs of research and documentation activities at each level. The cash value of resources used in research and documentation was estimated through interviews with participants at all levels of the RDU program as well as through the review of available documents. Adjusting for the costs of research and documentation is appropriate because these activities represented one-time (or non-recurring) costs. They were related to the information needs of Abt Associates' study and the earlier study by Far West Labs. Resource use for these activities was primarily a function of establishing and studying (rather than operating) the new federal RDU program. These modifications, also shown in Table 10-9 reduce the estimated total costs of the RDU program by 23% to $12,281,146.

Table 10-7

ESTIMATED PROJECT OVERHEAD COSTS

PROJECT	NIE Grant	Less		Plus	Equals
		Funds Distributed to Sites (Direct Costs) See Exhibit 10-5	Field Agent Personnel Costs See Exhibit 10-6	10% Allowance for In-Kind Costs	Total Project Management Costs
NRC	$1,256,000	$ 238,254	$ 240,000	$ 77,775	$ 855,521
Georgia	835,000	187,425	282,000	36,558	402,133
Pennsylvania	1,144,000	41,225	114,000	98,878	1,087,653
NETWORK	1,421,000	146,984	330,000	94,402	1,038,418
NEA	1,183,000	110,461	156,000	91,654	1,008,193
Florida	1,421,000	114,733	312,000	99,427	1,093,694
Michigan	1,092,000	358,241	192,000	54,176	595,935
TOTALS	$8,352,000	$1,197,323	$1,626,000	$552,870	$6,081,547

Table 10-8

NIE MANAGEMENT COSTS

Personnel Costs			
Program Director	2.5 person-years	$ 91,200	
Program Monitors	6.5 person-years	287,400	
Secretary	4.0 person-years	48,000	
Consultants		28,000	
Total Personnel			$454,600
Nonpersonnel Costs			
Travel		24,000	
Total Nonpersonnel			24,000
TOTAL NIE MANAGEMENT COSTS			$478,600

Table 10-9

ESTIMATED TOTAL RDU PROGRAM COSTS

Costs	
Total Site Costs	$ 5,744,544
Field Agent Personnel Costs	1,626,000
Project Management Costs	6,081,547
NIE Management Costs	478,600
External Research Costs	1,959,804
Abt Associates ($1,809,804)	
Far West Labs ($150,000)	
Total Costs	$15,890,495
Less:	
Costs of Research and Documentation:	
Site Level	$ 581,456
Field Agents	406,500
Projects	613,729
NIE	47,860
External Research	1,959,804
Total Research and Documentation Costs	$ 3,609,349
Total Costs Minus Research and Documentation Costs	$12,281,146

As noted in the description of the costs associated with each of the levels of the program's activities (sites, field agents, projects, and NIE), most of these costs were directly related to the extensive use of personnel time. Not only was personnel the most heavily used form of resource in RDU activities, but it was also the single most important determinant of costs, in particular of in-kind costs. The service orientation of the RDU program activities was reflected in its labor-intensity.

In sum, this estimate of the total costs of the entire RDU program includes not only expenditures made by NIE and the seven projects but also the estimated value of resources such as personnel time spent on RDU-related activities. It includes as well the estimated total costs of all levels of RDU, from site-level operations to NIE administration. It must be emphasized that this figure represents the real cost of the program, as opposed to direct expenditures of federal funds. While these figures are estimates of the value of all the resources utilized by the program, they do convey the magnitude of the RDU program effort.

RELATIONSHIP OF COST TO SITE-LEVEL OUTCOMES

Another purpose of the RDU cost study was to determine the effects of these costs on site-level outcomes. The outcomes with which costs might be associated were drawn from the overall study's model for examining impacts of the RDU program (see Chapter 2).

Process Outcomes

- Incorporation of the problem-solving process, such as repetition of all or part of the activities and procedures which the process involves.

Product Outcomes

- Extent to which principal and teachers report the problem has been solved through use of the adopted materials, including improvements in pupils' performance, attitudes, and behavior.

- Incorporation of the adopted product and/or materials, a measure of the extent to which use continues after implementation.

Unintended Outcomes or Spin-offs

- Impacts on school staff, a global measure of personal impacts including increased knowledge about curriculum development, increased self-confidence, improved teaching skills, etc.

- Impacts on the school as an organization, a global measure of impact on the school including improvements (as a result of participation in the RDU program) in curriculum, materials, school organization, staff morale, etc.

To determine the relative influence of site costs on each of the outcomes, various types of cost were considered: (1) dollar value of total costs incurred by site, both for the entire project and for each stage of the problem-solving process, (2) dollar value of direct costs and the percentage of total costs represented by direct costs, and (3) dollar value of in-kind costs and the percentage of total costs represented by in-kind costs.

Total Costs

Table 10-10 shows the results of rank order correlations between the outcomes and total costs. The total costs incurred at the site level during the entire project were not significantly associated with any of the outcomes. Schools with higher total costs (both direct and in-kind) were no more likely to achieve successful outcomes than schools with lower costs. Thus, it seems that an effort's total cost neither contributes to nor detracts from its success in a substantial way. However, a few significant correlations ($p \leq .10$) were revealed when total costs were disaggregated by stage of the RDU problem-solving process: problem identification, solution selection, and planning for implementation/implementation. There were moderate negative correlations between total costs incurred during problem identification and three of the outcomes, i.e. higher total costs during this stage were associated with lower incorporation of the problem-solving process, lower rates of problem solution, and lower personal impacts.

This suggests that higher costs in the early stages of a school improvement effort (most of which represents the cash value of personnel time) may be counter-productive. Participants may well feel overwhelmed by the amount of time they have to invest in problem identification and become discouraged and "burned out" before they even reach the solution and implementation of a solution. This finding corroborates the earlier observation in Chapter 7 that high levels of participation in the problem identification process had little or no association with outcomes, although faculty influence in later stages was important.

Direct Costs

Even if total costs were not strongly associated with outcomes, it was anticipated that either the dollar value or percentage contribution of direct or in-kind costs might be more significant. Table 10-11 correlates outcomes with the dollar value of direct costs and the percentage of total costs represented by direct costs. It suggests that a greater reliance on federal funds had significantly negative results on several outcomes. Higher direct costs meant lower incorporation of the problem-solving process, lower rates of problem solution and, most importantly, lower personal and organizational impacts. It was observed in a few of the schools with high direct costs and low impacts that the dependence on the RDU grant contributed to the view that the RDU program was a federal experiment or intervention instead of a local commitment to planned school change.

In-kind Costs

The percentage of in-kind costs is more strongly associated with success than total in-kind costs. Schools with a simple problem-solving process and low total costs can still have a high percentage of in-kind costs. The data in Table 10-12 suggest that a school's commitment of in-kind resources either reflects or motivates a desire on the part of parti-

Table 10-10

RANK ORDER CORRELATIONS BETWEEN SITE TOTAL COSTS AND OUTCOMES IN RDU PROGRAM

OUTCOME	TOTAL COSTS (across all stages)	COST BY STAGE 1	2	3
Incorporation of problem solving process (N=21)	-.09	-.48 p<.03	+.06	+.01
Problem solved (21)	-.31	-.37 p<.10	-.03	-.24
Incorporation of R&D Product (22)	+.20	-.19	+.25	+.32
Personal impact (21)	-.26	-.46 p<.03	-.01	-.09
Organizational impact (22)	+.04	-.22	+.06	+.17

Table 10-11

RANK ORDER CORRELATIONS BETWEEN SITE DIRECT COSTS AND OUTCOMES IN RDU PROGRAM

OUTCOME	DIRECT $	% DIRECT $
Incorporation of problem solving process (N=21)	-.28	-.39
Problem solved (21)	-.46 p<.03	-.18
Incorporation of R&D Product (22)	-.27	-.21
Personal impact (21)	-.61 p<.007	-.54 p<.015
Organizational impact (22)	-.40 p<.06	-.43 p<.05

Table 10-12

RANK ORDER CORRELATIONS BETWEEN SITE IN-KIND COSTS AND OUTCOMES IN RDU PROGRAM

OUTCOME	IN-KIND $	% IN-KIND $
Incorporation of problem solving process (N=21)	+.03	+.24
Problem solved (21)	-.17	+.20
Incorporation of R&D Product (22)	+.29	+.41 p<.05
Personal impact (21)	-.07	+.39 p<.08
Organizational impact (22)	+.18	+.49 p<.02

cipants to achieve successful outcomes. Indeed, increasing levels of in-kind costs in the RDU program were positively and significantly associated with stronger organizational impacts, greater incorporation of the R&D product, and more tangible personal impacts.

The organizational impacts of the RDU program on the school included a broad scope of implementation involving many students and a substantial portion of the class day, and major improvements in curricula and teaching methods. With respect to the incorporation of the R&D product, many of the schools reported that the product had been successfully incorporated into the school curriculum and guidelines had been written for the use of the product. Finally, personal impacts included increased confidence in teaching abilities, greater satisfaction in school decision making, and the acquisition of skills in problem solving and knowledge utilization.

Thus, in-kind costs were a significant factor in the success of some change efforts and the failure of others. The federal funds expended by the RDU program prompted substantial local investments of time and money which, in turn, were associated with positive school outcomes. The policy implication of this finding is that while extensive local contributions are a legitimate source of concern to grant recipients, these contributions help foster commitment to, and promote the success of, an externally initiated change program.

OVERALL FINDINGS

These descriptions of the costs associated with the RDU program can be summarized as follows:

Direct vs. In-Kind Costs

As noted earlier, almost all the costs associated with the RDU program were either direct (supported by the RDU grant) or in-kind (supported by non-RDU sources such as local funds, Title I or IV-C, etc.). Such a classification was important to estimate the full costs of RDU-related activities at all levels of the program and to capture the "hidden" costs of resource use not supported by RDU funds and not likely to be cited in expenditure records (e.g., uncompensated staff time). This cost study uncovered an extensive use of in-kind resources for the RDU program as a whole and particularly at the site level.

Direct federal expenditures for the RDU program totaled approximately $8.4 million. This amount was allocated to the seven RDU projects who in turn used part of their federal funds to make small grants averaging from about $2,000 to $8,000 to their sites. However, the estimated total costs of the entire RDU program were approximately $15.8 million. The difference between these figures is primarily due to in-kind costs, or the estimated value of resources used which were not supported directly by federal RDU funds. The magnitude of this difference indicates the large extent to which the program as a whole relied on the use of in-kind or "donated" resources.

Of the three levels of the RDU program (NIE, the projects, and the sites), in-kind costs were most significant at the site level. The ratio of direct to in-kind costs at the site level was even lower than for the program as a whole, with in-kind costs accounting for 80% of the total costs of RDU-related activities.

The sizeable difference between direct and in-kind costs, particularly at the site level, highlights the extent to which federal fund expenditures underestimated the real costs of the RDU program. Indeed, much of the resources that went into RDU-related activities--especially those at the site level--were supported by sources other than federal RDU funds. Both for the program as a whole, and especially for site-level activities, the use of non-federal resources was an important ingredient in the RDU program.

The fact that in-kind costs were relatively large is significant for planning future school improvement efforts because it reinforces the notion of federal grants as "seed money" rather than as the sole or permanent source of support. It demonstrates that even small federal grants (which in the RDU program were as low as $1,000) can leverage far greater investments of local resources. Finally, it emphasizes the need to warn prospective participants that grant funds will not cover most costs and they must be prepared to contribute substantial amounts of their own time to meetings and other activities.

It is also important to reiterate the positive relationship between in-kind costs and site-level outcomes. Successful outcomes in several areas were significantly correlated with higher percentages of in-kind costs. Conversely, total costs and direct costs often had negative relationships with outcomes. This implies that managers of school improvement efforts should not be unduly concerned with the total costs of the effort or with the amount of external funding it attracts. Within the limits of the available resources, they should endeavor to stimulate local contributions of time and money as a way not only to support the improvement effort but also as a motivator of local commitment to the effort's success.

Personnel vs. Nonpersonnel Costs

As anticipated, personnel costs were much larger than nonpersonnel costs at all levels of the RDU program. The emphasis on the use of personnel was not surprising, considering the amount of group brainstorming, decision making and training that the RDU program required.

A very sizeable amount of the personnel costs were in-kind rather than direct. That is, a great deal of the time spent by participants in RDU activities was not paid for with RDU funds. This was especially true at the site level. The time was sometimes compensated with local or other non-RDU funds, but was most often donated without any charge to the RDU program by participating principals and teachers. Again, this emphasizes the importance of in-kind personnel resources in the total costs of RDU-related activities.

Resource Use by Stage

Of the three major stages in the RDU process (problem identification, solution selection, and planning and implementation), planning and implementation activities accounted for the largest share of resource use at the site level. While the conditions in which the sites proceeded through the three stages varied, planning and implementation consistently took the most time, averaging about 12 months, while the first two stages averaged seven and five months, respectively. This was reflected in greater use of resources, especially personnel time in the third stage. Even if the amount of time for this stage had been limited to a period of one academic year (or nine months) as several program administrators suggested, the relatively heavy resource use

in this stage would continue to make it the most costly of the three stages. For example, planning and implementation activities in the Florida projects lasted an average of 13 months, averaged $790 in costs per month, and represented 57% of total costs. Even if the costs of the "extra" four months are subtracted from the total, planning and implementation would still represent 51% of total costs. While planning and implementation activities relied primarily on personnel resources, the use of nonpersonnel resources, such as materials or travel, was more extensive in the problem identification and solution selection stages.

Another finding pertinent to resource use by stage was the negative relationship between total costs in the problem identification stage and eventual site-level outcomes. Higher total costs at this stage meant lower incorporation of the problem-solving process and lower personal and organizational impacts. Since most costs tend to be incurred for personnel time, this suggests that encouraging such intensive participation at an early stage of a school improvement effort is not an effective strategy.

Participant Awareness of RDU Costs

While resource use and hence estimated total cost was substantial, project participants at the site level were generally unaware of the extent to which they would need to make use of a wide variety of resources that were often not supplied through RDU fund expenditures. In addition, many were also unaware of the costs associated with this resource use. When asked about use of certain resources at specific times during the course of their projects, many site-level participants were able to describe their resource use quite readily. However, when asked about the overall level of resource use and costs, even after the completion of their projects, many had little idea of the types and amounts of resources they had used and what the costs of the resource use had been. Indeed, both before and during project activities, site-level personnel involved in RDU activities had little idea about their resource needs for the completion of their projects. This suggests that site-level staff are likely to underestimate resource needs and costs when planning activities similar to the RDU project.

In addition to the sites, other levels of the RDU program also possessed generally inadequate information about resource use. Project administration in each of the seven projects provided little guidance to the sites about recognizing resource needs and planning resource use. In addition, they were also able to offer only limited information about their own resource needs and costs. For example, staff members in each of the seven projects were able to supply only very general information about the use of funds or resources from sources other than RDU funds.

Cost Variation and Inflation

The costs described in this report are based on the prices of the resources used during the periods of RDU project activities. Thus, they represent actual resource prices during the projects' operations from 1976 through 1979. Although the projects took place in a wide range of locations (urban, suburban, and rural in many parts of the country), the prices of comparable resources, such as teacher and principal time, did not vary as widely as might have been anticipated. For example, a rural school included in the cost study paid its teachers an average of $12,000 per year whereas

a school in a relatively affluent, urban area had average teacher salaries slightly under $13,000. In addition, the variations seemed generally representative of national average prices of such items as teachers' salaries.

Due to price increases caused by inflation and other factors, however, caution must be taken in applying the figures offered in this chapter to future RDU-type programs. For example, the Consumer Price Index (CPI) increased from 170.5 to 217.7* between 1976 and 1979, the period during which the RDU projects were active; this represents an increase of 28%. Even more importantly, the latest CPI (April, 1981) is 266.8 which means that prices haves risen another 23% since the RDU projects ended. The implication of this persistent inflation is that an RDU effort which might have cost a school $30,000 to undertake between 1976-79 would now cost at least 23% more or $37,000 (with additional increases as the CPI continues to rise over the life of the effort).

However, this increase in the CPI may overstate the extent of the increase in educational costs. For example, average teacher salaries rose by about 13% during the same period.** Thus, given the extensive use of personnel time (and of teachers in particular) in RDU activities in the sites, it seems likely that their annual costs may not have risen as fast as the CPI.

Despite changes in the prices of specific resources such as teachers' salaries, the ratios of in-kind/direct costs and personnel/nonpersonnel may be applied to cost comparisons for other years because they abstract from specific prices.

Comparing RDU Costs to Other Federal Project Costs

Several other federally sponsored programs engage in activities roughly comparable to those of the RDU program. For instance, Title IV-C and the National Diffusion Network are both federal programs which seek to stimulate innovation at the local school level. To offer some idea of how RDU costs compare to those of other programs, total federal expenditures for RDU and three other programs are shown in Table 10-13.

While this comparison provides only a general idea of the magnitudes of the four projects and of the average federal expenditures per site, it does indicate that the level of annual federal expenditures per RDU site was lower than that for other projects--$11,826 for RDU compared to about $17,000-$23,000 for Title IV-C and $27,000 for NDN.***

*CPI = 100 in 1967.

**National Center for Educational Statistics, Digest of Educational Statistics, 1979.

***A more thorough audit might pinpoint administrative or substantive reasons for the differences among the programs in average federal expenditures per site. However, in mid-1978, NIE and we agreed to eliminate a formal comparison between the RDU program and other federal dissemination efforts. An informal analysis might reveal that, based on the RDU cost study presented in this chapter, inter-program cost differences are due to different problem-solving procedures, emphases on product development and dissemination, use of field agents, and other factors.

Table 10-13

INTER-PROGRAM COST COMPARISON

	Federal Expenditures	Project Sites	Federal Expenditures per Site
RDU Program	$2,921,000 (av. per year FY 77-79)*	247**	$11,826 (av. per year)*
Title IV-C			
Georgia	2,944,000 (FY 79)	174	16,919
Michigan	6,277,000 (FY 79)	274	22,910
National Diffusion Network	5,239,749 (FY 79)	193	27,148

*Actual total federal expenditures averaged $2,784,000 during each year of the RDU program (FY 77-79) whereas federal expenditures per RDU site averaged $11,271 per year during this same period. The expenditure figures for the RDU program cited above have been adjusted for inflation (by inflating RDU expenditures in FY 77-78 to FY 79 prices) in order to compare RDU program costs with the FY79 costs quoted for Title IV-C and NDN.

**This is an estimate based on data from the project. In some cases, project definitions of a site included multiple schools. Approximately 300 schools received services from the program.

CONCLUSION

This analysis has explored the types and levels of costs incurred by sites which participated in this federally-sponsored school improvement effort. It has presented a methodology for retrospectivly collecting data on the costs of various forms of resource use (e.g. personnel time, nonpersonnel supplies and services, etc.) and for categorizing these costs as either direct costs of the RDU grant or as in-kind contributions of local principals, teachers, and education agencies. The study has demonstrated the preeminent importance of anticipating extensive personnel costs in planning school change; these costs accounted for almost 80% of the site-level costs of the RDU program. In addition, it has shown that the federal funds allocated by the RDU program leveraged large amounts of donated personnel time and other in-kind contributions. Each dollar of RDU grant funds prompted an average of four dollars of in-kind local support.

Finally, the cost study has suggested that successful school improvement efforts do not require large investments of total or direct costs. Some highly successful schools that experienced a wide range of positive outcomes from their RDU experience incurred relatively low costs while other, equally successful schools, had high total or direct costs. Moreover, these costs did not appear to be a significant factor in less successful schools, either. In-kind costs were more important; the percentage of total costs represented by local contributions was positively correlated with several outcomes. In-kind costs seem to reflect or inspire a commitment to the RDU program and a desire to accomplish meaningful school change. This suggests that educators should encourage these local contributions, and focus on the factors identified earlier in this report as having a significant impact on site-level outcomes (e.g. school characteristics, intervention strategies, etc.), if they seek to maximize the efficacy of school improvement efforts.

CHAPTER 11

CONCLUSION AND EPILOGUE

INTRODUCTION

The previous ten chapters have spun out the complex story of how schools participating in a single federally funded demonstration were affected by its relatively unusual assistance strategies. Each of the analytic chapters includes a summary of findings. Rather than reiterating these, our intent in this chapter is to return to some of the basic issues and questions that were laid out in Chapter 1, and to reflect upon what has been learned about them. Before turning to this more speculative task, we would like to emphasize what we believe are the most significant of the many findings that we have presented above. A more detailed discussion of the policy implications of this study are presented elsewhere (Louis and Rosenblum, 1981) but a final distillation of what has been learned emphasizes the following points:

- Dissemination programs create two types of outcomes at the school level: knowledge utilization/implementation and school improvement/capacity building;
- Engaging in a broad knowledge utilization activity is one of the most effective means of building capacity;
- Good products produce good school outcomes: quality control is a critical element of an effective dissemination strategy;
- External technical assistance is important to facilitate both knowledge utilization and school improvement. On the whole, training provided by experts and program developers that related directly to knowledge utilization objectives was more important than generalist field agent support in producing both knowledge utilization and capacity building improvements;
- Field agents (generalists) were important in facilitating improvements in problem-solving behaviors related to the knowledge utilization objectives, and increasing the level of effort and scope of knowledge utilization. However, a high level of involvement by agents may diminish capacity-building outcomes;
- The quality of the problem-solving process is less important in producing knowledge utilization outcomes than has often been thought. However, it is a key to school improvement outcomes;

- School characteristics such as the staff's orientation to change and the amount of principal influence are important determinants of how well schools will implement a problem-solving process, but they do not overwhelm the impact of the intervention;

- The biggest payoff in terms of both knowledge utilization and school improvement will be realized by emphasizing the resolution of problems that affect the core activities of the school--teaching and pupils;

- Costly planned change efforts are no more likely to have significant impacts on the school than less expensive ones. However, it is important to allocate a large proportion of the available resources to pay for staff involvement in selecting a solution and planning for implementation. It is also important to supplement external funding with internally contributed staff time and other resources; and

- While not all schools followed program specifications for a rational problem-solving process, and the implementation of an R&D-based, validated "product," the program intervention had almost no significant negative impacts on schools that might offset the generally positive findings presented above.

The remainder of this chapter is set in the framework of these basic findings, and they are referred to on several occasions. However, at this juncture we will steer a somewhat different course from the one taken in the detailed empirical analysis. While adhering to the realities of the findings, we will look forward to what has been learned about the process of change at the school level; in particular, we will look at aspects of the process that can be affected by externally funded but indirect interventions.

The basic problem that motivated both the demonstration and the study was to learn how to create more effective strategies for disseminating information to schools, and for increasing the impacts of that information at the school level, both in terms of knowledge utilization and general school improvement. In the first chapter, we indicated that dissemination, knowledge utilization and school capacity are intertwined in many practice settings, but that they also have independent theoretical bases, and represent quite different sets of concerns and perspectives on innovation and planned change in schools. Our analysis strategy, and the summary of findings presented above, emphasize the strategies that may produce various change outcomes in schools. While this information is essential for program design at federal, state and local levels, the question of "dissemination for what" must still be considered. We will, thus, discuss some of the findings that can be extrapolated from the study to illuminate the dilemmas of sending information (dissemination), receiving and implementing information (knowledge utilization) and changing the capacity of the school to function effectively as an educational institutution (school improvement). As part of this effort, conceptual schemas which further synthesize what we have learned about knowledge utilization and school improvement will be presented and

discussed. Finally, because most dissemination programs are premised on the importance of rational planning and decision making, we will discuss some of the implications of our findings for this topic.

DISSEMINATION AND SCHOOL CHANGE

The RDU strategy was, first and foremost, a dissemination strategy. The program design emerged from basic questions about how to send R&D-based information about basic skills and career education in ways that would make it more applicable to schools. Examples of the kinds of information that the program designers and project directors initially intended to disseminate include the regional laboratory developed Experience Based Career Education Programs, or the basic skills programs developed through Title III funds that were later validated by the Joint Dissemination Review Panel and funded through the National Diffusion Network (NDN). Of course, as we have also emphasized, RDU attempted to initiate a locally driven problem-solving process. However, a significant feature of the program was that this process could unfold only in the context of career education or basic skills problems, and could be addressed only through the use of validated information that was deemed of high enough quality to be included in a formal knowledge base. As we have seen, while there were many exceptions to the intended restrictions, the fact that they were included in the program design indicates that the dissemination objectives were the essential driving force underlying all programmatic efforts.

The RDU program may thus be easily contrasted with other strategies for school improvement that have been recently funded by the federal government. Existing "seed money" programs, such as Right to Read, make use of a knowledge base and encourage dissemination, but do not limit participating schools to the use of existing "knowledge bases." Other programs, such as the NIE-funded demonstration known as the the "Documentation and Technical Assistance Program" (Miles, 1980), emphasized the importance of locally developed knowledge, as well as "dissemination." Neither these programs, nor most other federal dissemination activities in education other than the NDN, place as much emphasis upon quality control in both developing a knowledge base and supporting implementation as did RDU.

The RDU program disseminated information far more broadly than its initial mandate to bring R&D-based curriculum and inservice products to local practitioners. Each project also developed a less well-defined but often quite cohesive knowledge base about the problem-solving process which was communicated either directly or indirectly to participating schools. While this knowledge base of problem-solving practices was clearly embedded in a long tradition of organizational development research and theory, it was not required to pass through any certification or validation procedure in the same way as the curriculum and inservice "products." Thus, on the whole the seven RDU projects were disseminating packaged, tested curriculum materials, whose expectations and training requirements had been carefully worked out with previous users. With few exceptions the projects did not make use of similarly tested or packaged materials to train local staff members in problem-solving skills or change management, but relied on a two-stage

process where field agents were trained, and these individuals then assisted (or sometimes trained) school personnel.*

Overall, this dissemination strategy had a considerable impact on many of the schools that were involved in the program. In particular, we saw that most of the schools completed a problem-solving process with reasonable success, adopted and implemented a product that they were satisfied with, and perceived a variety of other benefits from their involvement (see Chapter 4). In some senses, the story of RDU as we have presented it here sounds like a relatively singular tale of success. In the wake of current skepticism about the value of federally initiated change activities for local schools, the indirect dissemination-based strategy employed by RDU worked for most of the schools involved.

Why do we find that RDU had a significant effect on local schools, when others, such as Mann (1978), have recently claimed that schools "seemed compelled--some would say doomed--to a drudging rediscovery....of the usefulness of an axle stuck through a disk"? This is, in part, attributable to the general nature of the RDU intervention, and its combination of technical assistance, products, and a problem-solving process that was generally an improvement over the more common local efforts. (The efficacy of the strategies employed by RDU have been extensively dealt with in the previous chapters, particularly 5 through 7, and 9.)

In addition, however, we believe that part of the reason that we found RDU working is the broad view that we have taken of the possible outcomes of a dissemination effort. We might term our general approach as one that moves beyond implementation. The past ten years have seen significant attempts to unravel knotty issues related to the observation that, in schools, "plus ca change, plus c'est la meme chose." Much of this improved understanding of change dynamics in schools has focused on the explication of issues relating to how new programs are actually implemented in districts, schools and classrooms. While this focus has been effective in the short run, it has increased the degree to which "school improvement" is regarded as equivalent to the transfer and use of a new instructional technology or curriculum. There is a need to redress the balance, and begin increasingly to incorporate another kind of "knowledge utilization"--one that is not focused on implementing a new practice with fidelity to the intent of the developer or researcher, but on the less tangible improvements in school functioning which are often viewed as general school improvement outcomes or the development of increased "capacity" within the school. These school improvement or capacity building outcomes might be as subtle as reviving a cynical staff's enthusiasm for adolescent education, or as significant and visible as a permanent revision of the way in which curriculum is reviewed and monitored by teachers at different grade levels, or an emergence of new leadership roles among the teaching staff. Our study did not initially intend to examine these capacity building/ school improvement outcomes, except to the extent that they were reflected in the program objective of improving the problem-solving processes used in the schools. However, because "spin off" effects were so visible in the schools that we visited,

*There is, however, no evidence to suggest that providing direct training to schools would have improved process incorporation. Among the four projects analyzed in a companion volume (Louis and Rosenblum, 1981), the two that provided direct and standardized training to sites did not score more highly on process incorporation.

we were quickly led to emphasize the measurement of both knowledge utilization (implementation) outcomes and more general school improvement (capacity building) outcomes, even though these were not equally emphasized in the initial program design.

This decision had a major impact on our ability to report "success" at the school and program level. If, for example, the investigation had been confined to an emphasis on product incorporation and process incorporation as long-term measures of program success at the school level, the story would have looked quite different. As we have noted frequently throughout this volume , not only did process incorporation occur less frequently than other major outcomes, but the RDU strategies were also apparently less likely to increase the probabilities that it would occur. Indeed, some of our most potent results occur in the areas of staff development and general improvements in the organizational environment.

This discussion has two implications for the design and management of dissemination programs. First, it indicates that success is, in part, a matter of definition: a narrow focus on the assessment of a dissemination program may well produce a different set of conclusions. Second and more importantly, however, is the observation that dissemination programs can have broad impacts at the school level--impacts that can have further reaching consequences than a simple emphasis on implementation would imply. Dissemination research has tended to focus on a detailed explication of the process of sending, as was noted in Chapter 1, and some of our conclusions for how best to improve this process will be explicated below. However, it is important to refine our view of the consequences of sending and receiving information, particularly if we hope to be able to show any connection between program and organizational improvements, and student outcomes. As we showed in Chapter 4, the resolution of deeply embedded school problems--particularly those of student achievement--is as much a function of broad organizational improvement and staff development as of the incorporation of new curriculum practices.

Knowledge Utilization

We have noted that the RDU program sought to promote two distinct types of knowledge use--the use of new curriculum and inservice products, and the use of current knowledge about effective organizational problem-solving and change-management practices. In the previous section it was emphasized that the program as a whole appeared to resolve local problems and improve schools to some degree. However, we may also ask whether it was equally successful in promoting the two types of knowledge utilization that it sought to sponsor. Based on our analysis, the answer to this question is clearly no. While the data suggest that the application of intended program strategies is clearly predictive of such knowledge-utilization outcomes as the scope of implementation of a new program and the incorporation of that program into the school's routine activities, program features account for very little of the school's reported and observed plans to repeat a relatively detailed problem-solving process. In fact, both quantitative and qualitative data indicate that the program failed to make significant inroads upon the general tendency of school personnel to prefer home-grown solutions and local expertise (Miles, 1980). Despite the fact that in the RDU program both external products and external human assistance were highly

valued, instances of significant process incorporation were largely a function of pre-existing characteristics of the school (such as having higher levels of teacher influence in decision making, and having engaged in previous problem-solving activities).

Why should this be the case? The answer lies, we believe, in the same explanation that Gross, et al. (1971) offered to explain the non-use of a teaching innovation at Cambire Elementary: vague expectations for behavior change and poor resources to support the change activities. In addition, a paradox of program design allowed schools to select a product for implementation, but frequently imposed a problem-solving process from the outside.

First, in many cases the expectation of what the problem-solving process could and/or should constitute, and the underlying expectations for school and individual behavior were quite unclear. Teachers and principals often did not understand why they were being asked to engage in certain activities and, in more than a few cases, found them meaningless and repetitive. For example, in some cases RDU projects required a needs assessment, even though an existing needs assessment (which may not have met the standards set by the project) was reasonably up-to-date, or there already was a great deal of local consensus about the nature of the problem. While school personnel occasionally looked back and indicated that, in retrospect, the decision to conduct additional or more detailed needs assessments was appropriate, at the time it was often irritating and confusing. As compared to the R&D-based products (most of which included some clear instructions for implementation, along with training assistance), materials to help local educators meet the pace and scope of the problem-solving activities did not exist at the beginning of the project. There were also serious concerns on the part of involved school staff about the timing of activities, and many indicated that problem-definition activities were too drawn out while careful implementation planning was abbreviated, or did not occur at all.

Second, and more speculatively, the teachers (and principals) occasionally felt that the process activities were imposed upon them without real consideration for local conditions. Because teachers and administrators participated very actively in choosing products, the latter were able to avoid the "NIH" (not invented here) syndrome. The problem-solving process, on the other hand, no matter how effective it was felt to be, was typically viewed as being very different from previous practices, and probably impossible to duplicate within the resources of the district. Only extremely inventive and committed staffs felt that they would complete a similar approach again without external assistance. The approach was not typically reinstated, but rather viewed as an interesting but not particularly replicable experience. Over half of the teachers surveyed, and almost a third of the principals, indicated that RDU had had no effect at all on "the way in which problems are solved in the school."

Thus, as we move to the broader question of what we have learned about how to improve knowledge utilization at the local level, we must emphasize that our observations are confined to the utilization of curriculum and inservice materials. Given this caveat, however, we believe that the data presented above allow us to develop a reasonably good conceptual

model of how knowledge utilization was facilitated in the RDU program where knowledge utilization is defined as the sum of three of the RDU outcomes discussed in previous chapters: the magnitude or scope of implementation, incorporation of the new curriculum or inservice materials into practices in the classroom or other school change, and problem resolution.

A Model for Knowledge Utilization

A conceptual model was developed by searching the regression tables presented in the above chapters, and looking for robust predictors (e.g., those that appeared as significant standardized regression coefficients in two or more equations).* This approach was necessary because many of the regression coefficients were unstable due to the change in the variables that were entered in different equations. The model is presented in Figure 11-1.

The model assumes that scope of implementation is an antecedent of both product incorporation, and problem resolution, but is not a "sufficient" cause of either. Without an innovation of some magnitude, it is unlikely that an identified problem will be solved. In addition, changes of low scope are unlikely to result in formal incorporation, perhaps because they involve alterations of common practice so minimally that they do not warrant an overt effort to formally embrace the "innovation."

A first scan of the model shows one important feature: two variables are predictors of all three knowledge utilization outcomes. These are product quality as perceived by the implementing staff members, and a problem focus on pupil performance and/or classroom organization. This cluster indicates that there is a "rational" basis to knowledge utilization among teachers, despite many arguments to the contrary.** All other things being equal, if teachers in a school define a problem that is associated with their core activities and context--teaching and pupils--and select a new program or set of activities that they believe contains new and relevant materials and ideas, implementation and incorporation are much more likely to take place. This hypothesis is so strongly supported in our data that it leads us to question the accuracy of images of teachers' use of information that stress the unpredictability, intuitive behavior and need for personal reinvention that characterize teachers in their typical contexts (Huberman, 1980). We suggest, with all respect to those who advocate for "garbage can" or anarchic models of organizational behavior, that given the opportunity and an appropriate set of structures, teachers who attempt to approximate rational problem-solving behavior will be more successful. This is not necessarily incompatible with an emphasis upon the craft orientation, or a reliance on intuitive judgments--these may, in fact, be the only mechanisms for rapid day-to-day adaptation in the classroom. However, when making decisions about school-wide problems and school-wide innovation, the unpredictable, intuitive teacher can adopt a more managerial perspective.

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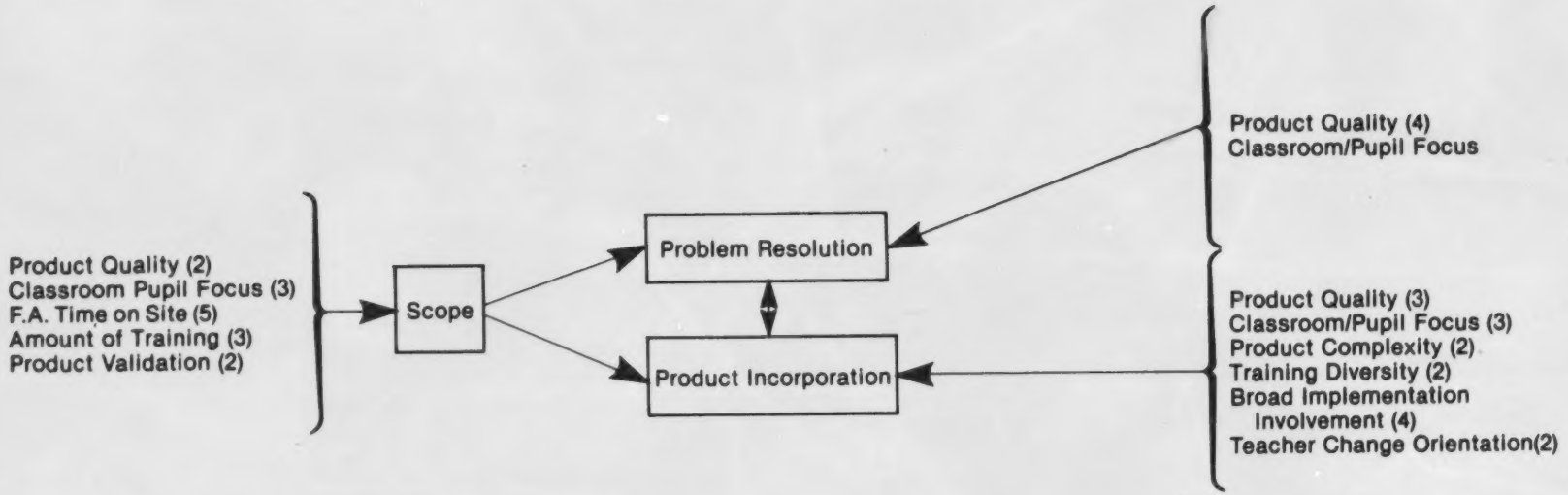
*Various colleagues have suggested that we test this model through statistical modeling procedures. However, because of the large number of variables in the model, and the small N, path analysis of LISREL would be statistically unstable and inappropriate.

**Throughout this chapter, as in previous ones, the term rationality is used to connote organizational processes, and not individual choices or organizational outcomes.

FIGURE 11-1
A Hypothetical Model of Knowledge Utilization in Schools*



*Number in parenthesis indicates the number of regression equations in which the variable exhibited a significant regression coefficient.

Aside from product quality and a classroom/pupil focus, there are substantial differences in the factors which contribute to different knowledge utilization outcomes. Scope of implementation is influenced most strongly, as we have seen in previous chapters, by external technical assistance, both from the field agent and from other trainers. As we have pointed out, the field agent contact helps to set and sustain a framework of expectations for behavior (perhaps increasing the degree to which "rationality" in decision making occurs), stimulates a broader problem definition, and helps to encourage and support faculty efforts to engage in more extensive change programs. Increased training helps to reinforce this commitment to the innovation among a larger number of teachers and provides skills necessary for them to use new materials and concepts in their work. Again, such training may tend to set expectations for use which encourage broader implementation, and more sustained and pervasive use. Product validation, on the other hand, does not cause broader scope. Rather, validated products tend to require more change on the part of teachers, and are often oriented to school-wide adoption. Thus, the selection of a validated product implies a commitment by the teachers and principal to broader and more comprehensive change programs.

The incorporation of new practices is stimulated by a somewhat different set of unique predictors. The most important factor is the breadth of involvement in implementation. As we argued in previous chapters, incorporation is by definition an organizational process, for it involves decisions to require certain behaviors of teachers, to replenish materials, to provide training for new recruits, to write curriculum guidelines, etc. The breadth of involvement at the time of implementation is, we believe, a surrogate for the spread of some concern and interest beyond the immediate implementing group, to a broader group composed of all interested parties. In addition, it reflects the change in status of the decision-making team or group from a small "facilitating team" to a more broadly based "implementing team" (Chapter 7). Thus, ownership and commitment are spread to both decision makers and users in an effective change process.

Two additional variables reflect the complexity of the change program: the complexity of the product itself, and the diversity of training sources. Where the change effort involves many components, and when the implementation plan calls for different kinds of support for these components, organizational processes are put into motion that are difficult to reverse. Thus, a set of supplementary career education materials can be left on the shelf and ignored at any point, but a complicated program such as Experience Based Career Education (EBCE), which affects the core of the educational curriculum and structure of a school is harder to put aside. In sum, once implemented a complex product is more difficult to completely undo, although it can, of course, fade away with neglect like any other innovative practice.

An antidote to fading away, however, is having an innovative staff. While the orientation of the teaching staff toward change does not seem to affect the early adoption and implementation behaviors of the school, it has a deep impact upon whether the change will endure into the future. Presumably in less innovative schools discontinuation will occur through increasing resistance of teachers to new practices which are at odds with their more conservative approach to education.

One notable feature of this entire model is the limited impact of the problem-solving process. This has been discussed in some detail in Chapter 7, but is highlighted here in the context of a model of robust predictors of knowledge utilization. The administrative leaders in the school are represented only indirectly, as actors who may support a broadly based implementation process, and as facilitators of sound product selection. A participatory approach that emphasizes faculty involvement also seems to have little effect on knowledge utilization. As disturbing as this finding may be to advocates of power equalization in schools, it is, of course, quite consistent with other findings which suggest that teacher and principal influence in the school may have little to do with the adoption and implementation of comprehensive change (Rosenblum and Louis, 1981).* As we shall see, this does not imply that participation and the problem-solving process are unimportant. They do, however, appear to be weakly linked to knowledge utilization either directly or indirectly. This is, we believe, largely a function of the general eagerness of school staff members for better mousetraps: as long as the selection and initial presentation of a new set of practices to teachers does not arouse resentment, and appears to be an improvement over existing practices, most teachers will be willing to give it a try--particularly if they can be involved in helping to design the implementation process. (See also Gross et al., 1971.)

School Improvement

We originally intended that the study's focus on capacity building be limited to measures of the incorporation of an improved problem-solving process. However, as we have pointed out, our understanding of the ways in which RDU could improve schools and build their capacity for self-renewal (Miles and Lake, 1967) was expanded. Throughout the study, we have examined overall organization development results (such as improvements in curriculum and materials, climate, school organization, participation of teachers in decision making, colleagiality, morale, and the school's willingness to turn to external resources) and personal growth and staff development (learning, changes in self-confidence and attitudes toward work, leadership and learning more about problem solving and R&D). Given our inability to explain process incorporation, these organization development and staff development outcomes represent our operational definition of school improvement and capacity building.

Several observations may be made about when and how more general school improvement occurred in the RDU program. The first is that only in a few cases did capacity-building objectives supplant the knowledge utilization and innovation objectives which were at the core of the program. For example, in only 10% of the sites did we find that schools were high achievers on capacity-building outcomes, but poor achievers in knowledge utilization outcomes. This statistical finding is confirmed by our site

*It is clear that there is considerable controversy about the degree to which administrative support has a positive influence on implementation and institutionalization. Some studies show strong principal effects. However, an equal number show limited effects. This literature is reviewed in Rosenblum and Louis (1981).

visit data, which suggest very strongly that capacity building tends to occur in conjunction with knowledge utilization activities, and not instead of knowledge utilization.

Even more important, however, is the observation that knowledge utilization tends to facilitate capacity building in schools. Certainly one of the main outcomes for many of the RDU schools was a dramatic increase in professional communication which accompanied a participatory attempt to define a concrete problem, and to select a solution. And improved communication leads, in a number of cases, to more concerted attempts to solve other "problems" and a more generalized concern with self-renewal. Teachers who are actively involved in knowledge utilization activities are more likely to report personal staff development benefits than teachers who do not participate (Chapter 7), in part because of their greater exposure to new ideas and consultants, and in part because of the leadership roles that they adopted with their peers. Similarly, the best predictors of organization development outcomes are the scope of implementation and the degree to which teachers report that the problem is solved (Chapter 4).

As Derr (1976) and others have noted, schools have not embraced the value of organization development, and may have some tendencies to resist it when attempts are made to impose it from the district level. On the other hand, when teachers and principals become involved in a concrete knowledge utilization activity, capacity-building outcomes may occur either as a consequence of the significant effort that they expend in very task oriented problem solving, or because the effective school-wide implementation of a new, locally chosen program increases the general sense of efficacy in the school.

Despite this relatively positive conclusion about the congruence between knowledge utilization/implementation objectives and school improvement/capacity building objectives, as we have noted above, major and permanent change in the process by which schools resolved their problems was typically not achieved. Far less than half of the teachers surveyed, for example, felt that there had been improvements in the degree of participation that teachers had in decision making. Thus, the observation that knowledge utilization may stimulate broader school improvement and capacity building must not be inflated to a conclusion that RDU schools had become "self-renewing." In addition, RDU represented a special set of circumstances in which externally imposed resources and expectations about how the knowledge utilization process would occur created an environment that permitted more attention to capacity building. No district, and probably few externally funded programs, will recreate the RDU structures and resources in a time of rapidly shrinking resources largely because staff development and other forms of organizational improvement tend to be viewed as frills in an era where basic school programs are under threat. However, staff and organization development may also take on new potency as teachers and administrators attempt to cope with additional fiscal constraints. Thus, a major issue centers on what our analyses suggest are the factors that local districts (or future federally or state-funded programs) should take into consideration if they wish to engage in organization development and staff improvement in the context of a knowledge utilization activity.

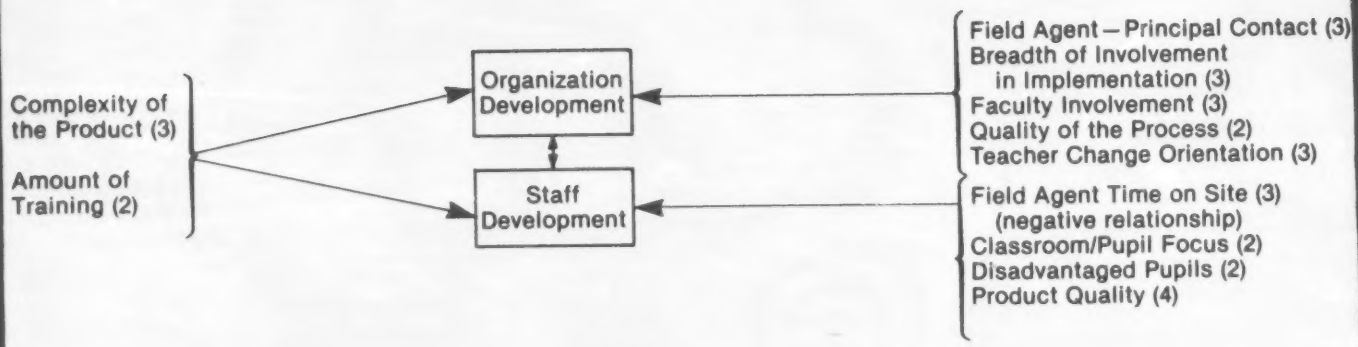
Using the same procedure which generated a conceptual model of knowledge utilization (Figure 11-1), variables that contributed to the explanation of organizational improvement and staff development in several different regression equations were isolated . The relationships of these to school improvement outcomes is presented in Figure 11-2.

In this model two variables contribute to both organization and staff development: the complexity of the innovation (product) being implemented, and the amount of training received by staff in the site. The combination of these two variables reinforces the conviction, articulated above, that the process of implementing a significant curriculum change program is a major route for improved organizational and staff capacity. The complex program adopted within RDU tended to affect schools and teachers in multiple ways. Individually Guided Education (IGE), for example, involves changing the entire staffing structure of the school, in addition to introducing new curriculum elements. San Diego Right to Read (one of the most popular reading programs for secondary schools) involves a potpourri of different approaches to stimulating student motivation, providing compensatory instruction, and integrating reading into content area classroom instruction. Implementing either of these or other complex programs necessitates changes of sufficient magnitude that they often stimulate the development of internal leaders among the teaching staffs, increase communication, require significant learning of new skills for teachers, and other factors that contribute to organizational and individual change. In the absence of training, on the other hand, schools may lack the resources not only to implement, but to further develop understanding and capacity. However, typically most schools that implemented less complex innovations also sought less external training, and thus, did not benefit from the stimulation and the opportunity to learn and/or reinforce new skills.

Looking further at the variables that predict organization development outcomes most convincingly, however, it is clear that implementation alone does not produce organization development. Rather, the group of variables that is strongly associated with the organizational improvement outcomes centers directly upon the nature of the process. Participation--both through high levels of faculty influence, and through the involvement of all significantly involved parties--is important, as is the quality of the problem-solving process. Thus, both the rationality of the decisions and the way in which decisions are reached are important. This cluster of predictive variables distinguished this model from the previous one which presented the relationship between knowledge utilization outcomes and predictors. While breadth of involvement in implementation emerges as important in both models, the knowledge utilization model gives no strong support to the hypothesis that the process of decision making is particularly important. Rather, it suggests that product characteristics and external assistance are most critical in knowledge utilization outcomes. The relative importance of climate and process is reinforced here by the fact that teacher change orientation, or the basic tendency of the staff to support and encourage innovation, may be key.

In addition, the model which best explains school improvement/capacity building outcomes suggests that too much reliance on external assistance

FIGURE 11-2
A Hypothetical Model of School Improvement and Capacity Building in Schools


Complexity of the Product (3)
Amount of Training (2)
Organization Development
Staff Development
Field Agent – Principal Contact (3)
Breadth of Involvement in Implementation (3)
Faculty Involvement (3)
Quality of the Process (2)
Teacher Change Orientation (3)
Field Agent Time on Site (3) (negative relationship)
Classroom/Pupil Focus (2)
Disadvantaged Pupils (2)
Product Quality (4)

may be counterproductive. The association between principal-field agent contact and organization development outcomes, coupled with the negative relationship between field agent time spent on site with the team and staff development outcomes (Chapter 6) suggests that external assistance roles must be relatively circumscribed if they are to be effective in promoting capacity building. Working through an internal agent--often the principal--may be more important than providing direct stimulus and support to a team. As we pointed out in Chapter 6, it is entirely possible that better trained and more experienced agents may not have produced this counterproductive result. However, some support for our findings may be found in the Miles et al. (1978) study of OD in schools. In that study, the involvement of external consultants was found to be negatively related to institutionalization. The authors imply that the role of external OD specialists is most effective when providing support to an internal OD consultant. In addition, our own study indicates that there is a consistent negative relationship between federal contributions and capacity building/school improvement outcomes.

The distinctive factors that affect staff development are more similar to those that affect the knowledge utilization outcomes discussed under the previous model. That is, a classroom/pupil focus and high product quality are important to achieving high levels of individual and personal rewards. One additional factor is of interest here, however. Schools with a high proportion of disadvantaged pupils are more likely to achieve staff development payoffs. This is probably true because morale and sense of efficacy may tend to be lower in these schools than in more affluent environments, and successfully completing a problem-solving process may therefore have greater impacts on job satisfaction and morale.

SOME REFLECTION ON RATIONAL PROBLEM SOLVING IN SCHOOL

As we have noted in previous chapters, there is some consensus in the organizational literature that sound decision making and planning requires attention to certain aspects of the process, such as careful identification of organizational needs or problems, careful and precise definition of problems and what may be required to solve them, the development of consensus among those affected by the problem about what would be needed to solve it, a careful search for a variety of different solutions, and so forth. On the other hand, it is acknowledged that these planning activities often lack essential features that might be termed "rational"; they are arbitrary, rushed, rely on implementing "solutions" without an adequate understanding of what the problem is, and fall short in their adequacy of plans, blueprints and development of common understandings of what is to be achieved.

Current theories in education tend to emphasize the non-rational aspects of decision making and planning in schools. Many theorists have gone so far as to question not only whether organizational rationality is actually the behavior mode in schools, but whether it is possible or desirable (March and Cohen, 1976; Weick, 1976; Farrar et al., 1980; Huberman, 1981). Among the many reasons that are presented for lack of rationality in the typical decision making behavior in schools are:

- The segmented nature of work in schools, which prevents teachers from having sustained professional contact with their colleagues;

- The press of daily routines in the classroom, which leaves teachers and administrators with little time for more long-range planning;

- The "craft" orientation of educators, which results in placing greater value on experiential knowledge than scientifically based or "validated" information from external sources; and

- The vulnerability of schools to "political" influence from various significant outside constituencies.

These and other features of schools and educators are, perhaps, real constraints on rational behavior and decision making in schools (although we doubt that schools are, in fact, less rational than other formal organizations). In fact, many who have observed attempts at planned innovation in schools have noted that what is pointed to as rational planning upon closer observation appears to be a veneer of organizational myths which thinly covers a more richly textured but imperfect accumulation of ad hoc decisions and personal adaptations.

When we began the study of school improvement in the schools served by RDU, we too expected to find little evidence of rational problem-solving behaviors, even though this was a major goal of the program. If our objective had been to document departures from an ideal set of rational behaviors, we would indeed have found rich data sources within the RDU schools, many of which we have presented in case materials found elsewhere (Louis, Kell, Chabotar and Sieber, 1981). However, despite departures from the ideal embodied in the RDU program, on the whole we came away convinced that what occurred in the participating schools was different from more typical planning and decision making behaviors. In addition, based on the criteria of rationality that were discussed in Chapter 4, an unexpectedly large proportion of the schools were, in fact, acting in accord with program objectives. At each stage of the problem-solving process, we rated 50% or more of the 90 schools in our intensive sample as having adhered to principals of a sound decision-making process either to a "great extent" or a "very great extent." As we have also noted at various points in the volume, this achievement did not occur in favorable or placid organizational contexts. In many cases, schools did not become involved in the program voluntarily, and initial reactions were not favorable. In addition, schools were plagued by a variety of critical events which, in many circumstances, would be expected to interfere with reasoned decison making and planning.

The above conclusions should not be interpreted to mean that the RDU schools conformed to textbook versions of planning. Rather, based on our own previous experience in studying planned change in schools and that of others, we were simply surprised at the degree to which considered, deliberate and reasonably well thought through choices were made and implemented. This raises two significant questions that can be addressed only partially. The first is why did the program appear successful in stimulating something approximating rationality of organizational behavior, and the second is why, given the success of the activities, were only bits and pieces of the process being repeatedly applied in the schools?

Our observations, and much of the analysis presented above, suggest that the general strategy of providing an external support system composed of human and technological resources and relatively small amounts of money may have directly affected the degree of rationality. Several factors account for this impact. First, the availability of resources and externally imposed expectations created conditions in many schools that allowed a temporary alteration of the normal isolation of teachers in classrooms. Although it required energy from teachers and administrators (as is evidenced by the level of in-kind resources), it also provided some partial compensation, most typically by reducing "classroom press" through providing release time for teachers on the teams. The role of outside helpers--particularly field agents--was in large measure to disrupt the equilibrium of the schools. Field agents were not only facilitators, they were also outsiders to whom many of the schools felt accountable. Because many of the projects provided formal "milestones" as guides against which schools could measure their progress through a problem-solving process, there was a structure that provided them with a rationale for the existence and duration of the "temporary system" which most teachers found to be quite different from the normal mode of decision making. Thus, while the problem-solving activities were locally driven and not externally directed, they were conducted in a context where there was continuous external support and stimulation to perform in certain ways.

The very reason why it worked--the existence of an external system which both supported and monitored decision making--also contributed to low levels of incorporation. Because of the dependence of the "temporary system" on external support structures and roles, learning a new set of skills (which many teachers reported they felt they had done) is not a sufficient cause of permanent change in organizational behavior. The new skills might allow a school to engage in a rational problem-solving process more efficiently on another occasion, but we suspect the energy required to initiate and carry through this process may be far more difficult to muster in the absence of external stimuli.

We also question whether a problem-solving process such as that used in RDU can typically be incorporated into the more normal functioning of a school. The amount of energy that was required of teachers and administrators to make a serious attempt over two to three years to solve a locally identified problem produced, in many instances, a certain level of fatigue. It would be overstating the case to say that staff members had "burned out," but even in the most successful schools we sensed little enthusiasm among most staff members for starting up again in another area of the curriculum. While the teachers generally enjoyed the RDU problem-solving process, like many other time consuming activities, it was not something they wished to dive into again. Thus, the frequently voiced statements that "we'll do it again, but probably not as thoroughly" reflect school staff members' belief that participatory, school-wide self-renewal activities can cut deeply into other important school and professional activities.

There is an additional, important question that the data presented in previous chapters also address directly: how important is rationality for knowledge utilization and school improvement outcomes? The answer that can be given to this queston may vary depending on the definition of rationality

that is used. On the one hand, the degree to which a rational decision-making process was followed appears to contribute less to the explanation of scchool outcomes than many who were involved in the program would have predicted. The analysis of simple correlations in Chapter 7 indicates that the coongruence of site behavior with textbook models of planning and problem-solving is associated with most knowledge utilization and school improvement outcomes. However, regression analysis and canonical correlations suggest that this factor is not that potent when compared with others that we measured. In the end, our conceptual schemas presented earlier in this chapter include the quality of the problem-solving process as a contributor to only one school improvement outcome: organizational development.

On the other hand, we may look at a broader definition of rationality, which includes more than the artifactas of planning behavior. The definition offered by Thompson (1967) focuses ont on planning activities per se, but on their outcomes: the reduction of uncertainty, particularly with respect to comre organizational activities. The major reductions in uncertainty associated with site involvement in the RDU program came from the access to high quality product materials, and to training and technical assistance that would permit more effective implementation. Thus, the fact that a local team reached the decision to adopt higher quality products and to take advantage of the external human resources available from the program--both relatively typical behaviors in the schools that we visited--was much more important than the process by which these decisions were reached. Again, this suggests that the RDU program was successful in fostering rationality largely because of the resource structure that it provided, and not necessarily because it tried to impose major changes in the way in which decisions are made in schools.

Before leaving the topic of rationality in schools, one final observation is necessary. We have argued that the resources provided by RDU, namely information and technical assistance, were important in achieving improved problem-solving practices and outcomes in schools. We must also point out, however, that externally developed resource and accountability structures, no matter how voluntaristic, always have the potential of inducing their own non-rationality. Berman and McLaughlin (1975) have emphasized the problem of "oportunism," which involves inventing school problems to match the priorities of funding agencies and programs. Our own data suggest that opportunism may have significant costs to schools, at least from a resource conservation perspective. RDU revealed a few additional sources of institutional non-rationality that occurred as a consequence of the availability of external resources. First, in a few instances schools felt presured to adopt products that they were not enthusiastic about, because the one that had captured their fancies were not "validated" and were therefore not acceptable to the project management. In most instances, this resulted in multiple adoptions, with the preferred product receiving most of the site's energies, but with a formal adoption to meet project criteria also being "implemented." A second source of nonrational behavior occurred because of the program's limitation to basic skills and career education problems. Some schools that we visited (approximately 25%) would, under situations of greater flexibility, have identified other problems as more important had they been allowed to. Finally, in a number of schools that were involved, the "problem" in question was not one that seemed, either to them or to us, very severe. In some cases, the problem identification and solution selection process revealed that a perceived problem was not as

significant as was previously believed, or that the existing curriculum was as good as most of the available "solutions." Nevertheless, most schools and projects found it difficult to terminate relationships, and schools that did not have very significant needs were carried through until the end of the program. Given the energy and resources necessary to carry through an RDU-like process in schools, this may be assessed as a real opportunity cost for both projects and their clients.

As a dissemination program, RDU was, as we have observed, a narrowly focused demonstration. As such, however, it could not meet all, or even a large number, of pressing school needs. While program managers and policy makers may take heart at its success, they must also face its limitations. RDU was successful in part because it was limited to basic skills and career education and, indeed, these are pressing issues for many schools. Our data even suggest that this focus on classroom-level and student achievement problems may have helped to increase the impacts of the program. However, from the perspective of the user, a more permanent dissemination system, whether federally or state-funded, that operated in such a constrained fashion would have seriously limited utility. Schools have a broad set of needs, including management problems, staffing problems, and curriculum problems, that occur in areas where there is little R&D information, and few validated products. While our data support a dissemination focus in the sense that the characteristics of the products and the ways in which messages are sent are deeply important to producing desirable school outcomes, from a practical standpoint it is difficult to justify withholding less than perfect information, or less than optimal messages in the face of pressing problems that are perceived by users. Thus, this study should not, we believe, be used to support a recommendation that an RDU-like program be implemented in each state. Rather, the findings--particularly those elaborated in Chapter 9 and in the other models--should be incorporated into the improvement of existing state and federal practices, which are often designed to serve a more comprehensive set of needs and problems, with more limited resources.

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